The Business Magazine for Makers & Users of Chemicals
Management, Research, Production, Marketing

CHEMICAL INDUSTRIES

Consulting Editors

Robert T. Baldwin
L. W. Bass
Frederick M. Becket
Benjamin T. Brooks
J. V. N. Dorr
Charles R. Downs
William M. Grosvenor
Walter S. Landis
Milton C. Whitaker

Contents

Volume 49 Number 3

SEPTEMBER, 1941

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An open letter....

TO USERS OF MATHIESON CHEMICALS

★★★★★★★ ★★★★★★★

● The demand for many of our products for both direct and indirect national defense purposes has been greatly in excess of anything we had anticipated. In some cases, this greatly increased demand has made it impossible for us to take care of our customers' normal requirements. But in all such cases we are meeting the unusual conditions to the best of our ability.

We realize the serious problem that has been created for many users of Mathieson products by this emergency curtailment, and we are doing everything we possibly can to ease the situation. We are using this "open letter" as one way of asking our customers to bear with us during this emergency period.

Your business is appreciated. Your acceptance of Mathieson Chemicals has been the backbone of our success. Your orders are being filled as rapidly as the priority of defense deliveries will permit. And in the meantime we ask that you do not order more than you would ordinarily need for minimum current requirements.

★★★★★★★ ★★★★★★★

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The Reader Writes—

Magnesia from Serpentine

The various articles dealing with "Magnesium" that have appeared in your Magazine from time to time have all been read with a great deal of interest.

Particularly the article by Mr. W. C. McIndoe that appeared in the August number.

On page 168 Mr. McIndoe makes reference to serpentine as a possible source of magnesia and since this happens to be a rather familiar subject to me I take the liberty of enclosing some information on this subject which might prove of interest to you.

H. R. BRANDENBURG
Chemist and Metallurgist
Concord, Calif.

The "Magnesia from Serpentine" processes developed by the writer owe their inception to the discovery that the molecular structure of serpentine is so altered by the application of elevated temperatures as to endow serpentine with a content of magnesium oxide, in available form, which did not exist before and that this form of oxide is extractible, or convertible into other compounds of magnesium.

"Dana's Mineralogy" defines serpentine as a hydrous magnesian silicate and ascribes to it the formula:

$3MgO.2SiO_2.2H_2O$ = Silica 44.1%, Magnesia 43.0%, water of combination 12.9%

On this basis one may conceive the reaction invoked by thermolysis to proceed as follows:

$$3MgO.2SiO_2.2H_2O + \text{heat} = 2MgSiO_3 + MgO + xH_2O$$

Under this hypothetical reaction the amount of magnesium oxide liberated would correspond to 14.+% MgO, practically; e.g. about one third of the total MgO content of the serpentine. This evaluation refers to the intereaction between a serpentine calcine and ammonium chloride, the degree of attack may be greater when other active agents are employed.

In the vast serpentine formations of the Pacific Coast, however, we are not dealing with the pure mineral but rather with rock formations in which iron replaces magnesia so that the magnesia content shrinks to an average value of about 37.% MgO. Traces of alumina will also be present and lime (CaO) is encountered in amounts ranging from 3.% down to mere traces. As minor accessory minerals we also find chromite to the average extent of 0.75% Cr. Nickel also is present in practically all serpentine formations in the form of magnesian-nickel-silicates, such as Genthite or Garnierite; for California serpentines the nickel content averages 0.20% Ni, but some formations may carry as high as 0.65% Ni. Serpentine formations in the Carolina's are known where the nickel content ranges up to 1.%, and over; while a certain nickel ore occurrence in Oregon, in what appears to be an altered serpentine, is credited with a nickel content of from one to two per cent and a potential tonnage running into several million tons.

Serpentine, an alteration product itself, may be found in certain localities to have suffered further alteration by contact metamorphism or other geologic causes. The serpentine for each specific formation is generally very uniform in character, but serpentines from different locations may differ in composition, structural and mineralogical characteristics. These secondary alterations, wherever they are in evidence, largely determine the degree of amenability of the serpentine to thermolysis and the processing schemes developed thereunder.

Greater yields will be obtained from some serpentines than from others, but with the large amount of information gathered on the subject the selection and location of types best suited for the purpose presents no difficulty.

As stated, the base upon which these processes rest is the feature of calcination. To illustrate, *raw* serpentine when subjected to attack by ammonium chloride will only yield a solubility product in the order of 0.2% to 0.4% MgO, whereas the *calcine* under otherwise comparable conditions of test may show a solubility product of up to 18.% MgO. By other means the extractions have been driven as high as 32.% MgO out of a total of 35.5% MgO.

The processing of serpentine, depending upon the ultimate objective, may be conducted along one of several possible lines of attack and procedures.

Thus the production of Epsom salt from serpentine may entail the use of sulfuric acid, etc. But Epsom salt may also be formed by subjecting serpentine to a sulfatizing roast in the presence of pyrites of iron, and so forth. The latter would be by far the cheaper method, the former perhaps the more expeditious one; in any event either method may be used. Either method will also serve to bring nickel into solution, so that both magnesium and nickel are recoverable from such a saline.

The oxide may also be produced by a method wherein the calcine is carbonated much in the manner that magnesia is separated from lime in the "Pattinson" process. Again a method of thermal dissociation of the sulfate with attending recovery of the acidic constituents for re-use may be employed; the process in the latter case becoming a cyclic one. Other and still more efficacious procedures may be employed and these also will be covered by patent applications now in process of filing.

On account of the present world situation the production of metallic magnesium is of paramount interest and it is believed to be readily feasible to produce magnesium metal, using serpentine as the magnesia supplying base, at costs competitive to now practised processes.

Magnesium metal has been produced under several processes of which the "chloride" process is one. This process, originated in Europe, has been the backbone of the vast German magnesium metal industry which, until recently, produced more magnesium metal than the rest of the world combined. And despite the fact that the preparation of the *anhydrous* form of magnesium chloride essential for the electrolysis is still a relatively costly operation one of the largest magnesium metal manufacturers of the world today, namely "DOW," still adheres to this process because it has proved itself as the most exact and dependable, also the safest metallurgical reduction process known.

For this reason the "magnesium from serpentine" process has been perfected towards the production of magnesium chloride suitable for electrolysis by as direct a procedure as possible.

Reduced to its simplest term, the processing of serpentine for the production of magnesium metal may be written as follows:

Serpentine + heat = available Mag. Oxide (280-500+# p. ton)

Serpentine + heat + HCI = Mag. chloride (99.65% purity)

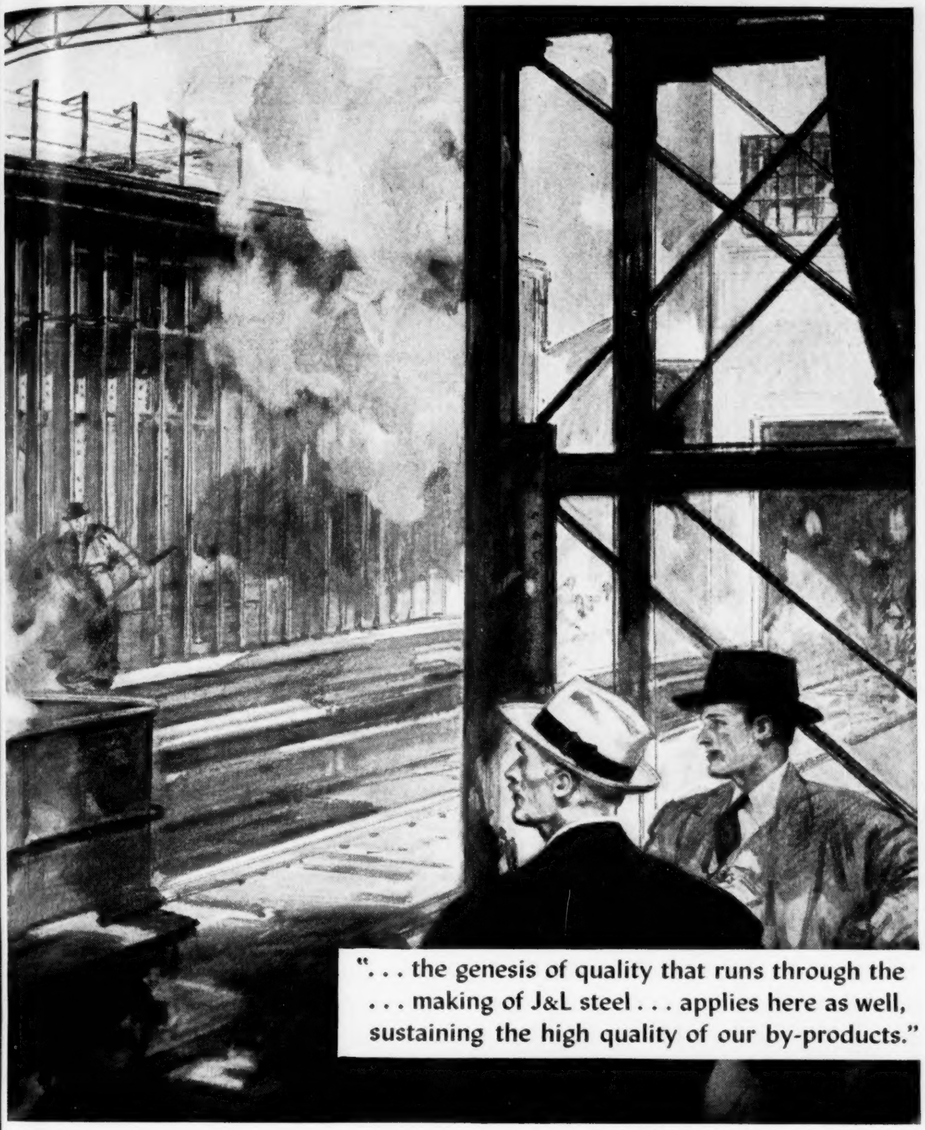
Mag. chloride + electric current = Magnesium metal.

Experimental work on serpentine was commenced, seriously, in 1934 and the scope and direction of the work has been constantly expanded; thus the processes do not fall into the category of "war babies". They are now covered by one patent grant with other applications pending or in the maturing stage.

Just Can't Stand It

After having been a subscriber to CHEMICAL INDUSTRIES for years I discontinued my subscription at the end of 1940. But I can't stand it. I enclose my check for three dollars to cover subscription for the calendar year ended 1941. Please send me the back numbers for this year.

GERALD WENDT
West Cornwall, Conn.



FROM AN ORIGINAL DRAWING BY ORISON MACPHERSON

the re-heating units in our rolling mills. All this from coal of our own mining, barged to our works on the rivers, yet not an oven is charged until our chemists have analyzed and verified the exact quality of each cargo. That is one phase of the control we maintain over all our raw materials — the genesis of quality that runs through the continuous, scientific process of making J&L steel. It is a control that applies here as well, sustaining the high quality of our by-products, so that users may get from them the same excellent performance always obtained in J&L Controlled Quality Steel. An industry within an industry it is — a partner to all industry in the production of innumerable things by which we live and many of the means by which we defend our hemisphere and our homes."

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BY-PRODUCTS

Vitamins from coal, synthesized in modern laboratories, are chemically and biologically identical with those derived from natural food sources. Vitamin N found in yeast, liver, milk, greens—reproduced through by-product process as nicotinic acid, is successful in combatting pellagra; B_2 occurring in milk, eggs, most vegetables, comes from coal as riboflavin, an essential for consumption of oxygen by body-cells and necessary to health of skin; B_6 present in embryo of cereal is the by-product pyridoxine hydrochloride; K present in spinach, cabbage, tomatoes, fish—essential in preventing hemorrhage, is coke by-product 2-methyl-naphthoquinone; E found in cereal grains, cottonseed oil, is reproduced from coal as alphatocopherol.

$125,000,000 worth of by-products was produced by steel industry during 1939 from manufacture of coke for blast furnace fuel.

Mary Ann at work was an attraction for old-time iron-masters of Pennsylvania a century ago, for the Mary Ann was the first blast furnace to use for fuel soft coal previously baked in an oven (coke), which enabled "her" to turn out a grade of iron superior to her sister furnaces scattered through the mountains and depending upon charcoal for fuel.

Naphthalene, moth balls and flakes and synthesized medicinal preparations such as aspirin, saccharine, novocaine and barbital are by-products of coal.

Fertilizer from coal, in the form of sulphate of ammonia, is increasing in application. During 1941 it is estimated agriculture will need 400,000 tons of nitrogen, of which 122,000 tons will be in sulphate of ammonia, produced from coal in the by-product coking process.

Germ-killing "Sulfa" family, sulfanilamide, sulfapyridine, sulfathiazole, which combat, with amazing success, 32 types of germs that produce pneumonia and kill 100,000 Americans a year, are coke by-products. New members of the sulfa family are sulfathiazole and sulfamethylthiazole, mortal enemies of dreaded staphylococcus infection of blood stream, fatal in 99% of all known cases. When the new sulfas were put to work experimentally, they cut the mortality rate to 20%. Now sulfaguanidine, recently announced, joins the sulfa family.

Ton of coal coked has average yield of 0.7 ton of coke; 0.06 ton of screenings; 11,500 cubic feet of gas; 12 gallons of tar; 26 pounds of sulphate of ammonia; 1.75 gallons of benzol; 0.55 gallon of toluol; 0.24 gallon of xylol; and 0.5 pound of crude naphthalene.

Smokeless heat for homes, apartments, public buildings, is now obtainable through use of domestic coke, as well as anthracite coal, petroleum oil and natural gas.

Nylon, most recent of artificial silks created from coal by-products, goes into such varied articles as stockings and parachutes.

ADVERTISING PAGES REMOVED

for Busy Men WITH PROCUREMENT AND PRODUCTION PROBLEMS

AT THIS YEAR'S CHEMICAL INDUSTRIES EXPOSITION

DECEMBER 1-6, 1941

The largest number of exhibits in more than a decade — chemical processing equipment, appliances, instruments, chemicals and chemical products, materials and supplies.

The most varied, and helpful group of exhibits ever staged for the benefit of the chemical process and related industries.

Exhibits staged by leading manufacturers who, by exhibiting, show that they are exerting their utmost efforts to serve industry.

Think what that means to you as a help in solving procurement and production problems!

Never before has the Exposition of Chemical Industries been able to do as much as it can this year to help busy men who are worried by procurement and production problems. By spending a few days at this year's Chemical Exposition, you can accomplish more than at any other time or place in the world—including your own office.

Three great floors of Grand Central Palace full of exhibits by the very top strata of suppliers—each of them devoting a week to the service of the chemical industries when such service is so important—each making it easy for you to see the actual products displayed and demonstrated—each providing chemical and engineering specialists eager to welcome consultation and discussion.

Come to the Chemical Exposition — bring your associates. See that all your key men attend. It's one of the most important things you can do at this time.

18th EXPOSITION OF CHEMICAL INDUSTRIES

GRAND CENTRAL PALACE, NEW YORK, DEC. 1-6, 1941

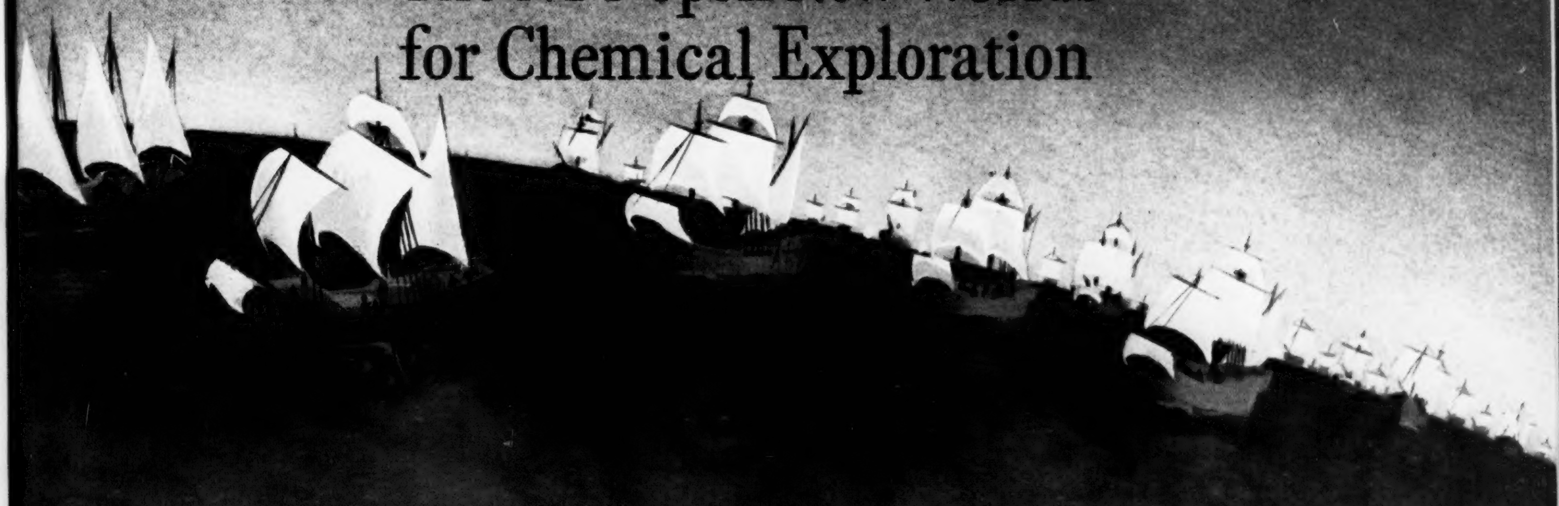
Managed by International Exposition Co.

DEDICATED TO SPEEDING UP AMERICA'S INDUSTRY FOR THE DEFENSE PROGRAM

536

COLUMBUS SAILS AGAIN!

The NP's open New Worlds for Chemical Exploration



Once again a new land of untold riches lies over the horizon . . . awaiting exploration. This new world . . . the world of Nitroparaffin chemistry . . . represents an opportunity for chemical research unparalleled since the early days of the coal tar industry.

The four Nitroparaffins themselves . . . Nitromethane, Nitroethane, 1-Nitropropane, and 2-Nitropropane . . . have many valuable solvent uses. But their innumerable derivatives offer the greatest field for investigation. Many of these are in commercial use today as detergents, wetting agents, insecticides, fumigants, and emulsifying agents. No one can foretell their ultimate importance.

Truly . . . "Columbus" sails again! And today as then, rich rewards in personal achievement and industrial progress are awaiting men of vision and imagination.

Technical information on the Nitroparaffins will gladly be supplied upon request.

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Washington

By

T. N. SANDIFER

THE long-awaited White House move to end the mounting confusion of functions between OPM, OPACS, the old-line defense agencies, and individual personalities who try to dominate the Washington scene has been made. Whether it will compound the present tangle or gradually evolve to some sort of ordered purpose is yet to be seen.

An experienced observer of the personalities now emerging from the turmoil, and of existing conditions, if he had to bet, would bet pessimistically. The changes so far are only at the top, but progressing downward, and the new arrangement should be shaken down to some extent by the time this appears.

T. N. Sandifer

Meanwhile some analysis of the change is in order. Superficially the new set of initials designates an overall agency, the Supply Priorities and Allocations Board, which ends the conflict between OPM and OPACS by dominating both. Nevertheless, it will be seen that Sydney Hillman, Harry Hopkins, and Henry Wallace, with Henderson, constitute a powerful New Deal bloc in the general organization. This may or may not be significant.

While William Knudsen stated that it should improve the situation the general reaction around the various sections of the organization, and among Washington observers generally, was unfavorable, even skeptical.

The change removes E. R. Stettinius, Jr., from direction of priorities and pairs him in a subordinate capacity, with Harry Hopkins to run the lend-lease program. Stettinius is a liberal, cooperative individual who lacks Hopkins' aggressive, self-starting characteristics, hence can not be expected in future to figure strongly in policy matters. Wallace and Hopkins at one time, were not on the best of terms. Whether such egocentric individuals as these two, with Henderson making a third, will work smoothly together is a question.

The point in such speculation is that this group has been organized largely as an attempt to solve the mounting vexation of the priorities muddle, with its increasingly paralyzing effect on run-of-mine business. The function of allocating priorities and materials will still rest with OPM, but it will be a subordinate OPM, subject to broader decision by SPAB. Henderson, for instance, is still price administrator, and in this capacity solely responsible to the President; he is also now a member of the SPAB, where he can throw his weight with Hillman, Hopkins, and Wallace, so that as a director of OPM's civilian allocation group the fact that he comes under Knudsen in this capacity means little.

As to the situation immediately confronting this organization the avalanche of orders and regulations which has marked the recent period has accelerated a condition discussed by Mack Williams in the preceding issue; it is now apparent that the public will be at the "ersatz" stage in many commodities and articles formerly in common use, at a much earlier date than was anticipated.

Chemicals are increasingly in evidence among the materials which industry is finding hard to obtain under present conditions, and the fact that up to now it has been difficult to draw a sharp line between so-called defense and strictly non-defense plants does not help.

This is expected to be one of the first problems tackled by SPAB; a broadening of industrial activity to check artificial unemployment caused by existing dislocations incident to the confusion in Washington. This can be achieved by spreading sub-contracts, and more common-sense allocations of essential supplies.

Further, manufacturers endeavoring to adapt their output to use substitutes have been assured of federal cooperation. It may be that the new agency will set some curb on defense requirements in the sense of examining these more closely. There is the story around OPM, not the subject of an official release, incidentally, of a Navy request for allocation of aluminum which was badly needed—for some Navy chairs. The request was returned, not too politely.

A procedure of OPM in sending several questionnaires out to industry has not been too successful, for obvious reasons. So far, the method has been confined to metals, and was discussed with trade and industrial groups beforehand, but its purpose was admittedly to locate supplies not in the open, and to learn what present use was being made of them. It was perfectly natural that some persons should immediately connect this inquiry with the pending requisition bill, and hesitate.

This bill, in passing, and also the price control bill, are definitely halted for the moment until after mid-September. The property seizure measure is tangled in discussions between Senate and House conferees, and the House pointedly halted progress on price control by adjourning, which gave the committee considering the bill an opportunity to likewise slow down.

Relative to scarcity, OPM acted recently to meet a threatening situation in the field of industrial alcohol as used for solvents, anti-freeze compounds, increasingly in munitions, and as a substitute component of products lacking other essential raw materials.

A special report soon to be issued by Commerce Department experts will show that despite an all-time record production of ethyl alcohol in the year ended June 30, which was nearly 100,000,000 proof gallons above the annual average for 1935-39, stocks on July 1 were nearly 11.4 million gallons below those of a year earlier.

In addition to the demands from munitions plants now coming into production, the other increased use of specially denatured alcohol indicated, has forecast a need of augmented production. Accordingly a plan is in progress for transforming a substantial part of the capacity of distilled spirits plants presently making whiskey or other liquor, to production of industrial alcohol.

Meanwhile OPACS (old regime) on August 27 issued an order fixing the maximum quantity of ethyl acetate (approximately 1 per cent) that may be used in proprietary solvents manufactured with specially denatured alcohol, and those now manufacturing proprietary solvents by the regular Formula No. 1, or any formula calling for use of more than 1 per cent ethyl acetate are required to submit a revised formula for these solvents if it is desired to continue their manufacture.

Hearings on the new tax bill were marked by a request from nonbeverage industrial consumers of ethyl alcohol for a tax differential on this product when used in nonbeverage industry, and these spokesmen pointed out in support of their request that such a differential is effective in every other nation except the United States. In Canada, for instance, despite war pressure, nonbeverage ethyl alcohol is

(*Continued on Page 373*)

Gazing Into the Industrial Crystal Ball

NO one can dispute the fact that World War I accelerated many important technological developments abroad and in this country and it is reasonable to suppose that the present international conflict will have a similar effect only much more pronounced and profound. Very likely all of the scientific advances of the 1914-1919 period would have been achieved in time even if the hand of Mars had been stayed a quarter of a century ago, but could our chemical industry, for example, have developed with such rapidity if we had continued to have free access to foreign-produced chemicals?

No reasonable person will mistake these words for either a direct or indirect plea for war to subsidize research or to provide the impetus for accelerating scientific and industrial progress. However, as Grover Cleveland once said—"We are facing a fact not a theory," and not to recognize that the present situation will bring about important changes is simply foolhardy and dangerous to the *n*th degree. Even our preoccupation with the needs of an all-out defense program should not prevent us from diligently searching for clues as to what is likely to come after the present conflict is over.

CHEMICAL INDUSTRIES

John Morris Weiss, of the consulting firm of Weiss & Downs, discusses in an article in this issue representative examples of what changes and advancements may be looked for in the chemical industry. The author lays no claim to any occult powers, nor does he attempt to examine the subject in all its possible ramifications, some of his prognostications may not be fulfilled, but his contribution on this absorbing subject will lead no doubt to considerable discussion which is highly desirable. It is well to remember that during the present emergency "economics" is now largely "out the window." Processes will be tried, developed and utilized without prime consideration as to relative costs.

This in itself means much in accelerating the pace in the preliminary and early stages. We are spending millions for synthetic rubber plants. Would this have happened were we not faced with a possible shortage of natural rubber? Synthetic fibers—rayon, nylon, casein wool, etc., are unquestionably in for a period of sudden expansion as a result of our action in stopping importation of silk from Japan. The defense program is responsible for an increase of astronomical proportions in productive capacity for magnesium and aluminum that can only result in startling innovations when the emergency is past.

Not all the changes to come will be purely technological in nature. New industrial producing areas in the Pacific Northwest, in the Southwest, in the Midwest and in the T. V. A. area are springing into existence over night. They cannot but exert direct influence on markets when "economics" again becomes a dominant and controlling factor. And there is even considerable doubt in many minds just now as to what kind of "economics" will ultimately prevail. There are many who believe firmly we are rapidly going down the road to "state socialism" or some form of "controlled economy." These expressions, of course, are generalities at best and no one at this stage can more than hazard a mere guess as to what kind of a world and country we will be living in a year from now, five years from now, or a decade hence.

The period ahead of us will be a great challenge to the scientific ingenuity and business acumen of management. It will call as never before for closely coordinated cooperation between the technical and commercial divisions of industry. Now more than ever before long-range planning is vital even though management will be called upon to steer a course through turbulent and largely uncharted seas.

CI
The Chemical Business Magazine. Established 1914

CI EDITORIAL

Walter J. Murphy, Editor

Metals and the Pacific Northwest: Northwesterners are already referring to the Bonneville-Grand Coulee area as the second "Ruhr in America" modestly admitting the Tennessee Valley to be the first. Certainly the industrialization of the Pacific Northwest is proceeding at an amazing pace the direct result, of course, of the defense emergency. In a few short months the Bonneville Power Administration finds itself in a distinctly "sellers market." A year ago the situation was very much the reverse of this condition.

One of the five largest electric generators in the world at Grand Coulee on the Columbia River is now ready to supplement existing generating facilities at Bonneville. The Reynolds Metals plant for aluminum production at Longview, Washington, is ready for operation and starts with a power consumption of 4,000 kilowatts and will use 60,000 by the early part of 1942. The Reynolds plant with the five Alcoa plants at Vancouver and three additional government-owned plants will raise aluminum production in the area to some 400 million pounds annually.

A relatively small quantity of Bonneville hydroelectric power is now going to the semi-commercial scale plant producing magnesium by the Doerner process, a development of the United States Bureau of Mines. Ultimately it is planned to produce some 24 million pounds at the Spokane location utilizing either the Hansgirg or the Doerner process.

This decision, it appears, rests largely on the efficiency of the Hansgirg process as demonstrated at the Kaiser-Permanente plant which is now reported to be ready to operate. It is no secret that there has been a great deal of skepticism concerning the efficiency of the process in the minds of some chemical engineers. The next two months should prove or disprove the claims made by Hansgirg and his engineers. The Spokane plant will be operated by the Kaiser-Todd Shipbuilding interests and the final decision as to which process is chosen should be made solely on the mature judgment of experts for time is the vital factor.

The Bonneville-Grand Coulee area is not the only western hydroelectric power development that is participating in the defense program. Late last month the Defense Plant Corporation approved a 63 million dollar magnesium plant near Boulder Dam to be operated by Basic Magnesium, Inc., and designed to produce 112,000,000 pounds a year utilizing as the raw material Nevada deposits of brucite.

Further expansion of both the Bonneville-Grand Coulee and Boulder Dam areas appears to be limited only by the ability of the government to augment existing generating equipment quickly. Western areas are known to have large potential supplies of low-grade ores and minerals that must be utilized to increase our supplies of the following strategic metals—chromium, manganese, tungsten. Some steps have been taken in this direction including the 1,000-ton-a-day tungsten treatment plant of the U. S. Vanadium Corporation, at Bishop, California, and the 1,000 ton plant of the Nevada-Massachusetts Company at Mill City, Nevada.

Far-reaching developments are now going on in the Far West the effect of which will profoundly change materially the present industrial life of America. A glance at the table in William C. McIndoe's article "Notes on the Pacific Coast Production of Metallic Magnesium" indicates the astonishing amount of power that will be available in the next few years in the Bonneville-Grand Coulee area. One can only suspect that the Industrial East will find itself in competition with the West to a degree much greater than was the case with an awakened South in the twenties.

Engineers of the Bonneville Power Administration are urging that fabricating operations be located close to producing points stressing the waste in transportation under the existing set-up. They also are pointing out possibilities for production of alumina from alunite, electrolytic manganese and even production of pig iron by an electric smelting process. The American tax payer is supporting the greatest research expenditure the world has ever witnessed.

The Container Problem: The serious shortages of certain important chemicals caused by the demands of the National Defense Program have overshadowed the almost equally important shortages of certain types of containers. One situation is just about as bad as the other. There is little use in stepping up chemical production if containers are unavailable.

The action of the Interstate Commerce Commission authorizing the Bureau of Explosives to permit reuse under certain conditions of light-gauge drums, popularly known as "single-trippers," will help, but will hardly solve the problem entirely.

Cylinders present certain special difficulties. Government purchasing of such materials as acetylene, oxygen, chlorine, etc., has been stepped up tremendously. The Government does not permit payment of cylinder deposits and hence the incentive for quick return is lacking. In all fairness it must be said that many of the federal agencies are up against a hard problem to solve —cylinders are scattered over wide areas and the means of keeping accurate records are not as readily available as they are to established private enterprises.

It would seem that the solution of the container problem is one that will largely depend upon a well-organized and sustained publicity drive on the part of the chemical manufacturers and the business publications serving the chemical consuming industries. Particularly bad offenders might be made to see the necessity of active cooperation if they were threatened with the possibility of furnishing their own containers.

A Ceiling on Formaldehyde: Leon Henderson and his OPACS have issued a schedule setting a sliding scale of ceilings on the prices which may be charged for formaldehyde, ranging from 4.25 cents to 9.5 cents per pound. Who would have suspected even six months ago that formaldehyde would be singled out for the distinction of being the first chemical to have a definite price ceiling placed on it?

Mr. Henderson has pointed out that this step was brought about by the action of certain dealers and has very graciously absolved the manufacturers from any attempt to raise prices. There is much to be said for price control but piece-meal efforts are hardly the best way to stop wild price inflation. Let us go "whole hog" if we must.

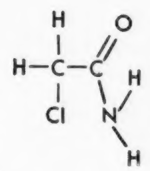
DOW

18A

SPECIAL PRODUCTS

CHLOROACETAMIDE

(TECHNICAL)



Solubility (grams per 100 grams solvent at 25° C.):

Acetone	6
Benzene	Insoluble
Carbon tetrachloride	Insoluble
Ether	1
Methanol	16
V.M.P. Naphtha	Insoluble
Water	10

Physical form:

Fine white crystals

Melting Point:

116.5—118° C.

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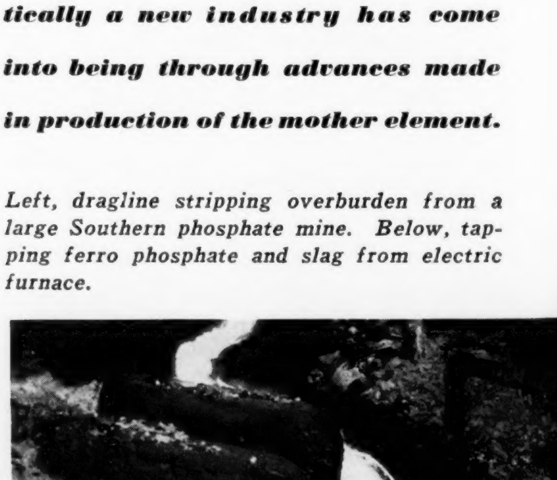
In Two Parts: Part One

THE FAMILY OF PHOSPHATES

By Paul Logue
Phosphate Division
Monsanto Chemical Company

From the sales development department of Monsanto comes this story on the "burgeoning family of phosphates" and some inside dope about the refined phosphate salts industry. Although fertilizers are the oldest application and the largest users of phosphate compounds, practically a new industry has come into being through advances made in production of the mother element.

Left, dragline stripping overburden from a large Southern phosphate mine. Below, tapping ferro phosphate and slag from electric furnace.



THE burgeoning family of phosphates owe their growth to the advances made in the last quarter century in the production of their mother element—phosphorus. Fertilizers are the oldest application of phosphate compounds and continue to represent the largest tonage, but in the so-called refined phosphate salts, virtually a new chemical industry has been brought into being.

Phosphorus—bearer of light—is produced in its elemental form by the electrothermal reduction of phosphate rock or phosphate-bearing ore. Few chemical processes surpass the drama of this operation. Huge electric furnaces, fed power through carbon electrodes, tear phosphorus free from the molecules in which it is held and extract it in substantially pure form. From phosphorus, burned in air comes phosphoric acid and from this versatile compound derive the modern phosphates.

Metals

Phosphorus and its compounds make valuable contributions in present-day metal industries. The element itself is an important alloying agent. Phosphor bronzes, used in bearings and other friction resistant surfaces, are well-known and widely used. The perfection of the electric furnace method of production, making available large quantities of ferrophosphorus has enabled its increasing use in iron alloying. By the addition of measured charges of this compound the phosphorus content of iron and steels can be readily controlled. In certain alloys it produces corrosion resistance and is particularly beneficial in steels where this property must be combined with high yield strength. In lower cost steels, phosphorus is used along as an alloying agent. Basic research in this important area has shifted the status of phosphorus from a "nuisance element" to one of an alloying addition of definite merit when properly handled.

In addition to phosphorus itself, phosphoric acid and the sodium phosphates are familiar tools in the metal industries. The acid is important in metal rustproofing treatments. Not only does such metal hold the coating more firmly and more permanently, but if the coating does chip or wear, the formation of rust is inhibited.

In industrial metal cleaning, both trisodium phosphate and tetra-sodium pyrophosphate are used for their highly effective detergency.

Water Treating

Both tri-sodium phosphate and tetrasodium pyro-phosphate are effective water softeners. Water is hard when mineral salts, principally of calcium and magnesium, are present. When water containing these salts is brought into contact with soaps, insoluble calcium and magnesium soaps are formed which settle out, sharply reducing the efficiency of the soap and giving rise to scum formation. When untreated hard water is used in steam boilers, the high temperatures con-

COMMERCIAL USES OF PHOSPHATES

- Fertilizers
- All Others
- Phosphorous
  - Alloys
  - Matches
  - Incendiary Bombs
- Phosphoric Acid
  - Catalyst—Petroleum Polymerization
    - —Alcohols from Petroleum Hydrocarbons
  - Dental Cement
  - Gelatine
  - Jelly & Soft Drinks
  - Metal Protection-Rustproofing
  - Sugar Refining
- *Sodium Phosphates*
- Tri Sodium Phosphates
  - Ceramics
  - Detergents
  - Fruit Cleaning
  - Metal Cleaning
  - Textiles
  - Water Softening
- Tetra Sodium Pyro Phosphate
  - Cheese
  - Metal Cleaning
  - Oil Well Drilling Muds
  - Soaps
  - Textiles
    - Scouring
    - Bleaching
    - Dyeing
- Di Sodium Phosphate
  - Cheese
  - Ice Cream-Condensed Milk
  - Textiles-Silk Weighting
  - Pharmaceuticals
- Sodium Acid Pyro Phosphate
  - Baking Powder
  - Burnishing Compound
  - Oil Well Drilling Muds
- Mono Sodium Phosphate
  - Boiler Water Treatment
  - Preparation of Magnesium Alloys for Painting
- Miscellaneous Sodium Phosphates
- *Calcium Phosphates*
- Mono Calcium Phosphate
  - Baking Powder—70,853 Net Ton
  - Self Rising Flour—10,000,000 Bbls.
  - Phosphated Flour
- Di Calcium Phosphate
  - Ceramics—Bone China
  - Dentrifice Base
  - Mineral Nutrition 2.3 CA-1.4 P
  - Pharmaceuticals
- Tri Calcium Phosphate
  - Antacid
  - Caking Inhibitor
  - Dentrifice Base
  - Mineral Nutrition
- *Ammonium Phosphates*
  - Matches
  - Textiles
  - Wood
  - Yeast
- *Miscellaneous*
  - Aluminum Phosphate
    - Glass
    - Paper
  - Ferric Phosphate
    - Mineral Nutrition
  - Magnesium Phosphate
    - Fireproofing
- Ammonium Thio Phosphate
  - Flotation Agent
- Amyl Di Thio Phospho-Oleate
  - Flotation Agent
- Tri Cresyl Phosphate
  - Plasticizer
- Tri Phenyl Phosphate
  - Plasticizer

vert the soluble mineral salts to insoluble precipitates which build up on the boiler surfaces in the form of scale. Scale is a very poor heat conductor and its accumulation cuts boiler efficiency.

Hard waters are softened by tri-sodium phosphate through its ability to react with the calcium and magnesium salts to form insoluble compounds. These compounds are precipitated in extremely fine particles which do not tend to adhere to metal boiler surfaces but settle as fine powder which can easily be blown out periodically.

Tetra-sodium pyro-phosphate is also of increasing importance in water treatment. It is highly effective, and, because of its relatively low pH, can be used where increased alkalinity is undesirable.

Textiles

The textile industry constitutes a broad market for virtually all the sodium phosphates. Tri-sodium phosphate is used here, as in other industries because of its high detergency. The detergent action of tri-sodium and the other phosphates depends upon two characteristics; their alkalinity which exerts a loosening and softening effect upon dirt, and in addition, a special function which the phosphate radical itself appears to perform in loosening and dispersing dirt and preventing its redeposition.

The use of sodium phosphates in textile processing, however, is not based alone on their detergent action. Tetra-sodium pyro-phosphate, for instance, is used in bleach baths, particularly with hydrogen peroxide, with which it has a modifying effect tending to prevent too drastic action of the bleach. The same salt is also used in dye baths, in conjunction with dyestuffs which tend to deposit unabsorbed particles on the fabric and cause subsequent "crocking". The presence of T. S. P. P. tends to prevent this deposition and insures a clean dyeing action.

Di-sodium phosphate, another brother of the same family has important application in silk weighing processes. The cloth to be weighted is treated first with a solution of tin chloride followed immediately by immersion in a solution of di-sodium phosphate, which reacts with the chloride and deposits finely divided tin hydroxyphosphate in the fibers of the cloth. Such weighting improves the hand, drape and feel of the silk.

In degumming silks tetra-sodium pyrophosphate is an adjunct of exceptional merit. Its value lies in the fact that it buffers the alkalinity of the soap solution and has an effective peptizing action on suspended solids. Its use results in improved degumming, more uniform dyeing subsequent to degumming, and elimination of chafe marks, scum and streaks.

Related to the uses of tetra-sodium pyro-phosphate in textiles is its rapidly expanding use in industrial and household soaps. Such "built" soaps, with other alkalis such as tri-sodium phosphate or silicates added, are of great benefit in hard water areas. In effect, built soaps carry with them their own water softening agent so that the effect of hard waters is minimized. But the results of such additions reach further in that the additive improves the emulsifying and dirt loosening properties of soap without increasing its alkalinity. The development of tetra-sodium pyro-phosphate for use in soaps represents one of the prime achievements of the last ten years in industrial chemistry.

The same dispersing effect that makes tetra-sodium pyro-phosphate a valuable detergent is the basis of its use in the petroleum industry. Fed down the drill hole of oil wells, it has a dispersing effect on the solids present in the muds. This reduces the viscosity of the mud and makes it more readily pumped in.

Foodstuffs

The phosphate family is of diverse importance in the manufacture and preparation of foodstuffs. Phosphoric acid itself is used in three important ways. In sugar refining, the acid is used with lime as a clarifying agent. Raw sugar syrup contains amounts of albuminous and other protein matter. When lime and phosphoric acid are added they react to form an insoluble calcium phosphate which precipitates out carrying with it the protein impurities. Depending on the process, the conglomerate either settles to the bottom and the syrup is decanted or filtered, or according to a more recent development, the precipitate is removed by a flotation or skimming process.

Below, phosphorous-bearing matrix, at the mines, Monsanto, Tennessee.

In gelatines, phosphoric acid is added as jelling agent. In this case, as well as in jellies, it functions in controlling the jelling action through maintenance of the pH at the required level. In jellies, as well as in soft drinks, phosphoric acid is a flavoring both as a replacement for fruit acids such as citric or tartaric as well as a flavoring in its own right (remember lemon phosphates?)

Ensiling Agent

Indirectly, phosphoric acid makes a contribution to food production in its use as an ensiling agent for green fodder crops. Through its use, it is possible to preserve succulent green crops in silos with minimum loss in nutritional value, palatability and bulk.

Both tetra-sodium pyro-phosphate and di-sodium phosphate are used as small additions in dairy products. Through its use, it has helped make feasible the fast growing packaged cheese industry. Packaged cheese, although ideally always of uniform flavor, color and consistency, must be made from natural cheeses that vary over a fairly broad range. In some cases, such cheeses when prepared tend to give off their fat, and globules of oil form on their surfaces which the addition of T. S. P. P. tends to prevent. Di-sodium phosphate, used for the same purpose in cheese, is also used in prepared milk and in ice cream. Here its action is as an emulsifier, tending to prevent agglomeration of solids and insure a smooth, creamy consistency.

Phosphates, particularly sodium acid pyro-phosphate and monocalcium phosphate have long been used as leavening agents. The function of any chemical leavening agent lies in its ability to react with sodium bicarbonate and release its carbon dioxide gas. The gas so released in a batter or dough, expands and aerates

it, creating the porous light structure that is desirable. Baking powders consist of sodium bicarbonate, an acid-reacting material such as sodium acid pyro-phosphate or monocalcium phosphate plus a stabilizing agent or diluent such as starch. The two active ingredients are combined in such proportions to enable their complete reaction. Monocalcium phosphate has been used in baking powders since the middle of the nineteenth century.

The development of self rising flours around the turn of the century was made possible by the availability of monocalcium phosphate leavening agents. With improvements in manufacture and purity control methods, this leavening agent and baking powders and self rising flours made with it have been consistently improved.

In addition to their use in self rising flour, monocalcium phosphates are added in preparing so-called phosphated flours. In these, a small amount of phosphate is added to counteract any errors in baking caused by the addition of excess soda.

The accelerating current interest in improved nutrition throws the spotlight on the calcium phosphates as diet supplements. Di-calcium phosphate, for instance, supplies two important elements needed for bone formation and when used with Vitamin D concentrates make a convenient and readily available mineral supplement. Tri-calcium phosphate is of interest in the same connection.

Ferric phosphate is being used increasingly as a vehicle for fortification of foodstuffs including flour. This compound is a stable and convenient way of introducing available iron into the diet. The recent government recognition of flour and bread fortification makes likely its increased use.

An important application of tri-sodium phosphate is its long established use as an anti-caking agent in salt, sugar and other granular products. Its action here is believed to be electrostatic in nature.

Medicinals

Related to the uses of phosphates as diet supplements are the time-honored uses of phosphates in medicinals and pharmaceuticals. The first commercially manufactured phosphate salt was di-sodium phosphate. This has been used for over a century in medicine. The same compound is also used today as an ingredient of saline laxatives offered under various trade names. Di-calcium phosphate is of special interest because of its value in dentifrices as a polishing agent. Tri-calcium phosphate and insoluble sodium meta-phosphate are used for the same purpose. These are effective polishing agents, yet without causing wear on the tooth enamel. Tri-calcium phosphate, in addition to its use in dentifrices, is employed as an antacid in treating the symptoms of minor digestive disorders.

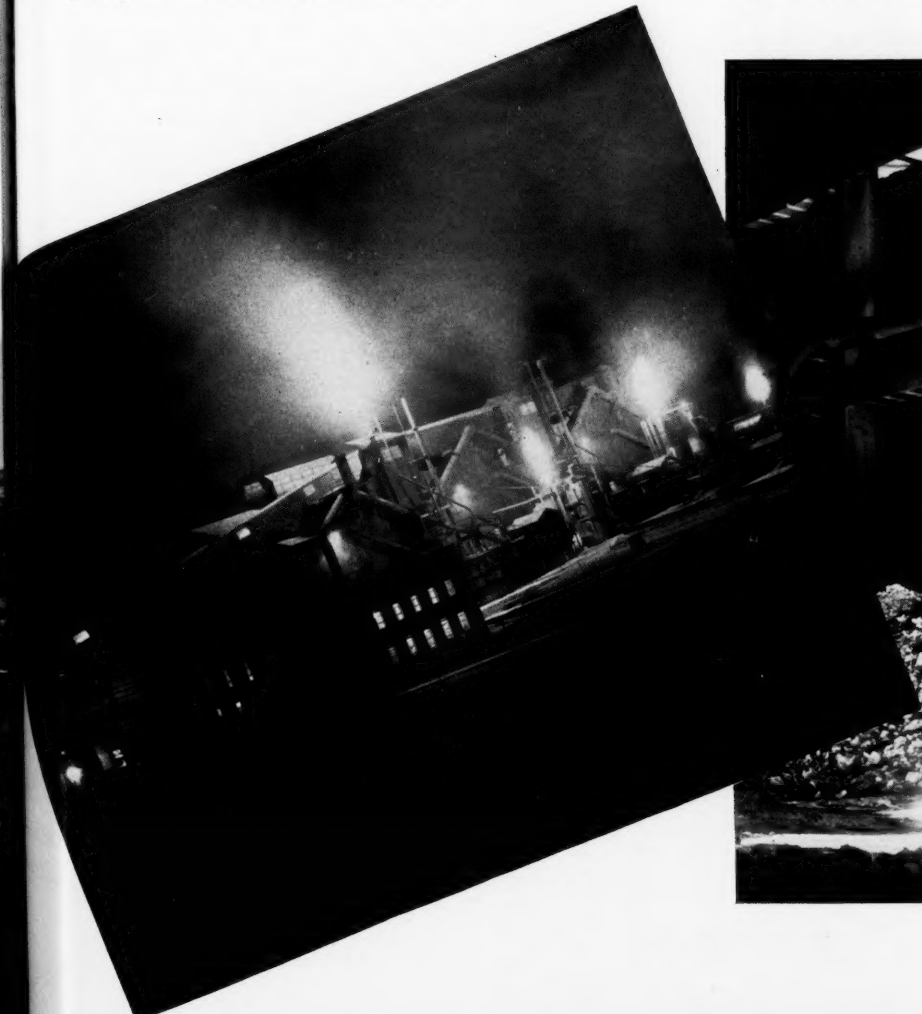
Fireproofing

Both ammonium phosphate and magnesium phosphate are widely used fireproofing and flame retarding agents. Ammonium phosphate is used in impregnating matches to prevent afterglow, and in treating textile and wood to the same end. The action of ammonium phosphate in such applications is two-fold. When heated, it gives off small amounts of ammonia, an oxygen-excluding-gas, which tends to snuff out the flame. Under heat it also tends to cover the combustible material with a glazy coating which acts as a fire resistant coating.

Plastics

Two of the newer phosphates, tri-cresyl and tri-phenyl are used in quantity in plastics production. In thermoplastic materials, particularly in cellulose group, they are used in formulating workable plastics from somewhat granular compounds while their value is enhanced, too, by their flame-retarding characteristics.

Below, sintering house, elemental phosphorous plant, Monsanto, Tenn.



Below, tapping ferro-phosphorous slag from the furnaces.

Completed 230 Kv transmission line Bonneville-Grand Coulee, tower 1147, 18 miles from the Grand Coulee Dam

Notes on the Pacific Coast Pro

In Two Parts: Part Two

The Pacific Northwest is rich in raw materials for production of magnesium. It offers excellent plant sites near the Bonneville-Coulee power network and on tidewater. Five transcontinental railroads are in the area. All these points are covered in detail by way of conclusion

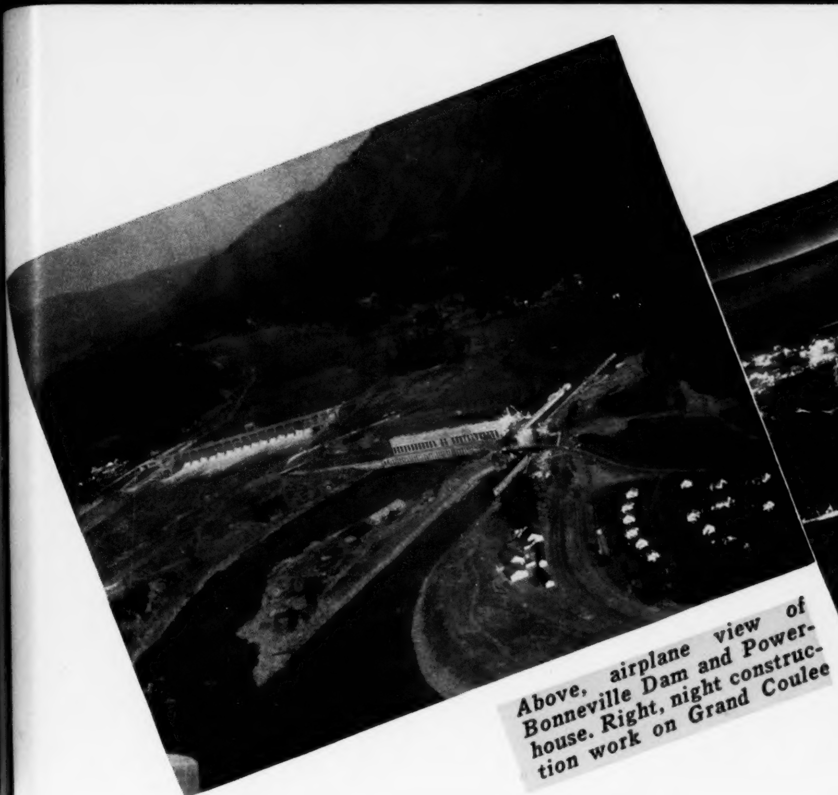
THE extreme reactivity of metallic magnesium — which causes it to continue to burn in steam if ignited; corrode in the presence of even traces of chlorides or iron; form a nitride when heated in air; and, as a powder, explode when ignited as an air-powder mixture — places serious limitations on processes for its manufacture, involving as they all do, purification by sublimation, or use of pure raw materials as in the aluminum industry. By careful design and manipulation, however, these difficulties can be largely overcome.

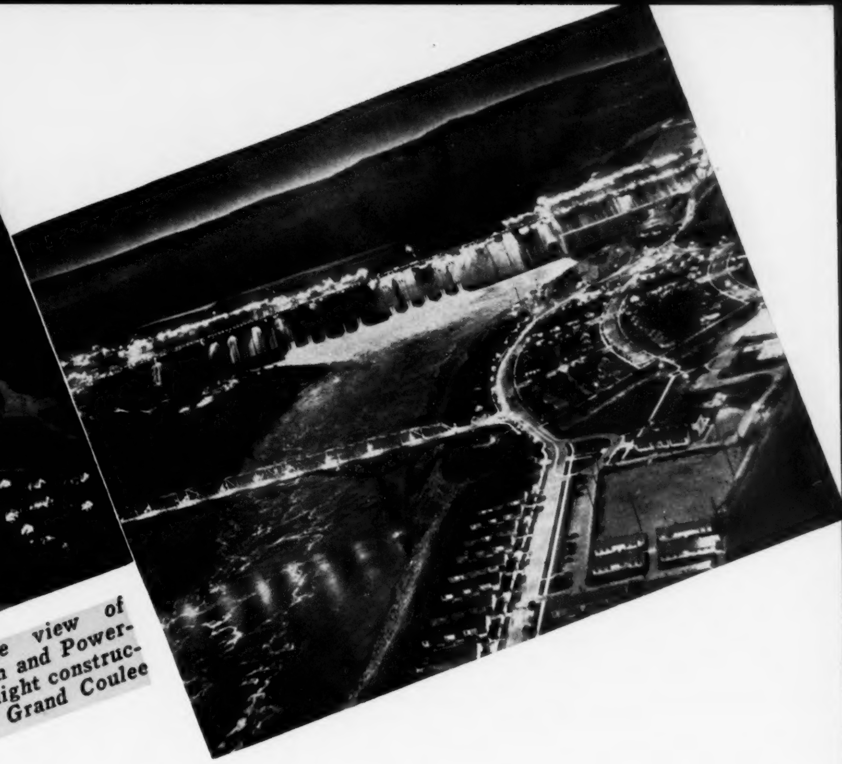
During World War I, two processes were used for the production of metallic magnesium: the "chloride" process of the Dow Chemical Company and the "oxide" process of the American Magnesium Company. The latter company discontinued the production of ingot magnesium and returned to the manufacture of alloys and fabrication in 1927.

For over a dozen years the Austro-American Magnesite Company has been experimenting with electrothermal reduction of magnesia (from dead-burned magnesite) with carbon and for about half that time have had a commercial sized plant in operation at Radenthein, Austria(28) and more recent plants in England and Korea. The most important contributions to the commercial electrothermal reduction of magnesia by carbon seem to have been made in Austria by Dr. Fritz J. Hansgirg,(29). Dr. Hansgirg, who originated the process, is at present in California supervising the installation of a magnesium reduction plant near Palo Alto, (based on his process modified by the latest improvements) for the Permanente Corporation, a subsidiary of the Todd-California Shipbuilding Corporation (Henry J. Kaiser interests).(4) Construction of this plant started in March 1941 under a certificate of necessity from the Office of Production Management. At first this Permanente magnesium plant will use magnesite ore (41.6% Mg) from Luning, Nevada.

Since magnesite ores are abundant in the State of Washington, of which the high grade, low-silica ores already go into the manufacture of furnace lining refractories for the steel industry, the U. S. Bureau of Mines in 1936 began a cooperative research with the State College of Washington on an electrothermal process similar to that of Dr. Hansgirg. A modified process has been reported, coupled with flotation concentration of the very abundant low grade ores not suitable for refractories. A small pilot plant has been installed at Pullman, Washington to translate laboratory results into commercial practice.(30)

Further and independent work is in progress in the Pacific Northwest for reducing natural magnesium silicates (such as olivine) to metallic magnesium. Successful development of this process would make immediately available the enormous deposits of serpentine (25.9% Mg); the great 40 square mile deposit of olivine (28.4% Mg) in Skagit and Whatcom Counties, Washington; the estimated 50 million ton olivine deposits on Cypress Island, Skagit County, and the





Above, airplane view of Bonneville Dam and Powerhouse. Right, night construction work on Grand Coulee

By William C. McIndoe

Chemical Engineer, Bonneville Power Administration

oduction of Metallic Magnesium

less known deposit in Grant County, Oregon.

Chloride Process

The Dow Chemical Company chloride process consists of the electrolysis of fused anhydrous magnesium chloride which is obtained in very pure form by careful fractional crystallization from deep well brines and equally careful dehydration of the magnesium chloride.

Raw Material. By calculation from Plate I, it can be shown that the Dow Chemical Company starts with a brine containing approximately 14 percent sodium chloride ($NaCl$), 9 percent calcium chloride ($CaCl_2$), 3 percent magnesium chloride ($NgCl_2$), and 0.15 percent bromine (Br), with iron, alumina, etc., as minor impurities.

Process. By fractional crystallization and careful evaporation, the Dow Chemical Company obtains the byproduct magnesium chloride used for their production of magnesium metal. Since the electrolysis of the fused chloride demands an anhydrous salt, the six molecules of water of crystallization must be removed. Careful evaporation in a current of warm air will remove five of these six molecules; but to avoid decomposition to the oxide, the final dehydration step is accomplished in a stream of anhydrous hydrochloric acid gas above 300° C.

The Dow Chemical Company is believed to have modified their process to include additions of excess quantities of calcined dolomite (or magnesite) to the brine followed by a carbonation step. This procedure serves the dual purpose of enriching the solution and of providing guarantees against possible insufficiency of supplies of anhydrous magnesium chloride. The ores are calcined to magnesium hydrate, which is admitted to the carbonater, where the lime residue is removed by precipitation with an excess of lime and the purified hydrate is then recycled. The remaining four-fifths of the magnesium, present in the form of the chloride in aqueous solution, goes through the evaporation and dehydration steps.

Electrolysis. Some sodium chloride is added to the fused anhydrous magnesium chloride to lower the melting point and improve the conductivity of the resulting electrolyte.

While the molten electrolyte is held between 670° and 730° C. (1238° to 1346° F.) the electrolysis proceeds at a current density of 16 to 35 amperes per square inch and voltage of 6 to 9 volts. In the Dow cell, the current efficiency is 70 to 80 percent and the power efficiency is 20 to 40 percent. Furnaces beneath the cells can hold the bath in the molten state or the electric power alone can supply the necessary heat. The fused metal rising to the surface of the bath is protected from oxidation by a coating of electrolyte. The purity of the metal produced ranges between 99.9 and 99.95 percent. Four to five pounds of anhydrous chloride yield one pound of magnesium. (See Plate I for a flow diagram of the modified Dow chloride process.)

Power Requirements. The power requirements of this chloride process are reported to be 8 to 13 kilowatt hours per pound of magnesium produced.

Equipment Requirements. Equipment requirements for the chloride process are a rectangular cast-steel furnace with graphite anodes suspended vertically, the steel pot furnace itself becoming the cathode. (29) (31) (32)

"Oxide" or Fluoride Process

The oxide process of the American Magnesium Corporation was actually an electrolysis of a fused mixture of magnesium and barium fluorides with small additions of sodium fluoride. The name "oxide" was derived from the fact that magnesium was fed to the furnace, the fluoride being formed on fusion at the 950° C. temperature of the bath. Calcined dolomite could be used in place of the dead-burned magnesite.

Raw Material. Calcined or dead-

burned magnesite or dolomite was the magnesium-bearing raw material for this process.

Process. Magnesite or dolomite was calcined to magnesia, MgO, which was then fused with an equal amount of barium fluoride, with small additions of sodium fluoride, and held at 950° C. (1742° F.). The barium fluoride increased the molten bath density, thereby causing the reduced metal to rise more freely from the cathode and also preventing too rapid settling of the magnesia which was added from time to time. Iron cathodes and carbon anodes were used at a current density of 40 amperes per square inch.

The solubility of magnesia in the bath was only about 0.1 percent, a distinct process drawback; a moderate amount of impurities in the magnesia could be tolerated, though lime was objectionable. Consumption of carbon anodes reached one-half pound per pound of magnesium. Approximately 1.7 pounds of magnesia were required to produce one pound of metallic magnesium. A final distillation step produced metal of 99.99 percent purity. (31) (32) See Plate II for a flow diagram. Difficulties of operation and the low solubility of magnesia in the bath have made this process more or less obsolete.

Power Requirements. Power requirements of the oxide process were between 14 and 25 kilowatt hours per pound of magnesium metal.

The voltage across the cell is 9 to 16 volts at 9,000 to 16,000 amperes. The current density is less than 40 amperes per square inch. The current efficiency is 50 to 60 percent, and energy efficiency, 10 to 20 percent.

Equipment. The equipment required for the oxide process is a rectangular steel furnace having iron cathodes and carbon anodes suspended vertically.

Electrothermic Reduction Processes

Two electrothermic processes* will be discussed briefly, both involving reduction of magnesia with carbon in a reducing atmosphere with intervening "shock chilling" to prevent the reverse reaction and with subsequent vacuum distillation as a purification step. The basic reaction for both processes is

$$MgO + C \rightleftharpoons Mg + CO — 119.2 \text{ Kg. cal.}$$

The fact that CO is a gas and passes over into the receivers along with the vapors of metallic magnesium, interposes difficulties for the reason that at all temperatures between 400° C. and 1800° C. the reverse (or oxidizing) reaction takes place with great rapidity.(28)

The first of these processes was developed by Dr. Fritz J. Hansgirg, used in the Austro-American Magnesite Company's magnesium plant at Radenthein, Austria, in Korea, and with certain modifications in England. Dr. Hansgirg is supervising the erection of a plant to use his process at Permanente, California, using magnesite from Luning, Nevada as the basic raw material. As mentioned earlier, this plant is under construction for the Todd-California Shipbuilding Corporation (Henry J. Kaiser interests).

The second of these processes is that developed to the pilot plant stage at Pullman, Washington, jointly by the State College of Washington and the U. S. Bureau of Mines, and comprising modifications of the Hansgirg process designed to fit low grade Stevens County magnesite ores.

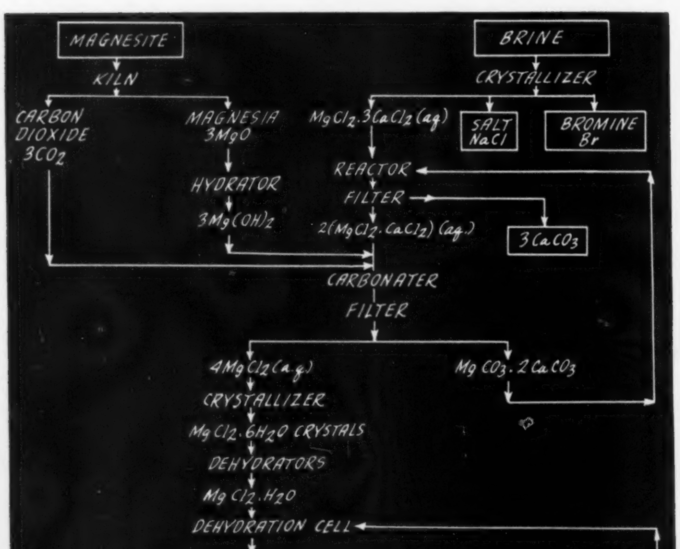
Hansgirg Process

The present references in literature to the Hansgirg Process date back only to the development of the pilot plant at Radenthein, Austria, for a furnace of 600 KVA, and nothing has been published pertaining to the recent development of the process in Japan and England in large scale unit operation of around 3000 KVA.(33) (34) (35) (36) In a private communication from Dr. Hansgirg, recent developments for the process are given in the following description:

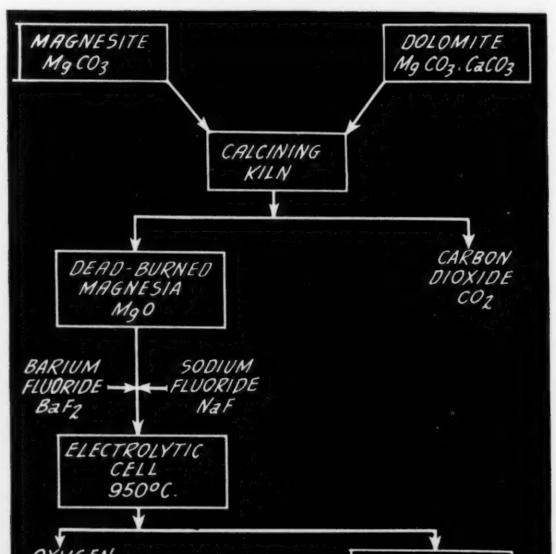
According to the Hansgirg process, dead-burned magnesite or MgO mixed with carbon, are reduced in an electro-furnace at a temperature between 2200°

* In addition studies are being made of the direct chloridizing processes of the I. G. Farbenindustrie and others which are based on the fusion reaction: $MgO + Cl2 + C \rightarrow MgCl2 + CO$.

Electrolytic Chloride Process
(Revised Dow Process)*
Plate I



Fluoride or "Oxide" Process
(American Magnesium Corp.)
Plate II



* *Doerner, H. A., U. S. B. of M., "Magnesium," Bull. P., Mining Expt. Stn., State College of Washington, July, 1937.*

and 2300° C. according to the following reversal equation:

$$MgO + C \rightleftharpoons Mg + CO$$

The reaction temperature being more than 1000° C. above the boiling point of metallic magnesium, the metal leaves the reaction as vapor mixed with an equal volume of carbon monoxide and must be chilled suddenly below 200° C. to prevent the reversibility of the above reaction.

Process: In practice, dead-burned magnesite or magnesium oxide is mixed with anthracite, petroleum coke, or charcoal in stoichimetric ratio to all oxides contained in the magnesite. This mixture is finely ground and by adding a tarry binder pressed to briquettes. Such briquettes are charged between the electrodes of a three-phase furnace. The electrodes strike the arc through a mass of carbon grains charged to the furnace. The furnace is operated at 2100° C. and the entire fed-in charge is immediately evaporated.

To recover the magnesium from the vapor phase without reversion to the oxide, a gas neutral to magnesium is introduced in the vapor stream as it leaves the reduction furnace at 2000° C., using 22 to 25 volumes of chilling gas for each volume of gaseous reduction products produced from the furnace. The temperature of the vapor is thus suddenly lowered to 150 to 200° C. After filtering the magnesium powder out of the chilling gas by wool bag filters, this gas is reintroduced to the process until the carbon monoxide content has reached a concentration of 7 to 8 percent. This means, in the actual operation, 25 percent of the gas in circulation is withdrawn for make-up to remove the carbon monoxide and to reintroduce such purified 25 percent portion into the main circulation of the chilling gas. For the new plant at Permanente, California, natural gas will be used as chilling gas and only 25 percent of the above-mentioned amount for the chilling will be introduced as natural gas and will also be withdrawn for other thermic uses of the cement plant after it has so passed through the magnesium plant.

The magnesium powder recovered from the gas stream is fed to a tabletting machine to press it without using a binder, which can be easily accomplished. This powder analyzes 60 to 65 percent metallic magnesium and contains also the impurities from the raw material.

Even as in the furnace 100 percent of the charge is reduced to metallic magnesium, by the chilling process only 80 percent of the magnesium is recovered as a metal and 20 percent forms by back-reaction MgO plus Carbon. It depends on the amount of impurities in the raw material how much of the residue, after the metal has been evaporated from the dust, can be reintroduced to the primary reduction process. Starting from dead-burned magnesite with 90 to 92 percent of magnesium oxide, it is easy to recover 90 percent of the magnesium content in the magnesite.

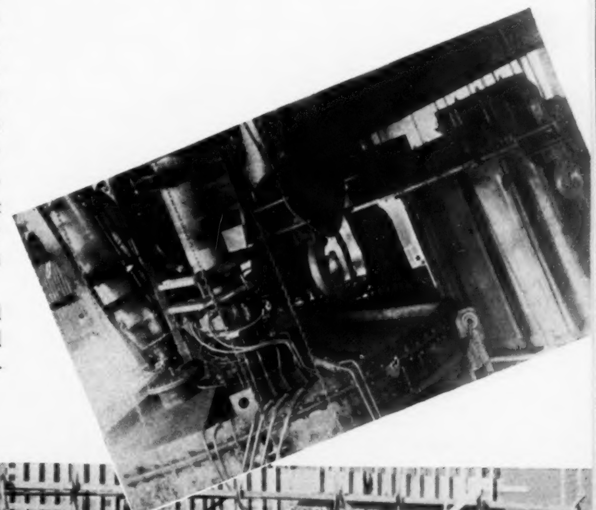
The magnesium powder, in tabletted form, is charged to retorts, and the metal is recovered by a high vacuum sublimation process in crystallized form of high purity. The crystals are melted in crucibles in the normal way and cast into ingots.

Power Requirements: The power consumption, including the reduction and distillation process, has been analyzed by Landis as follows:

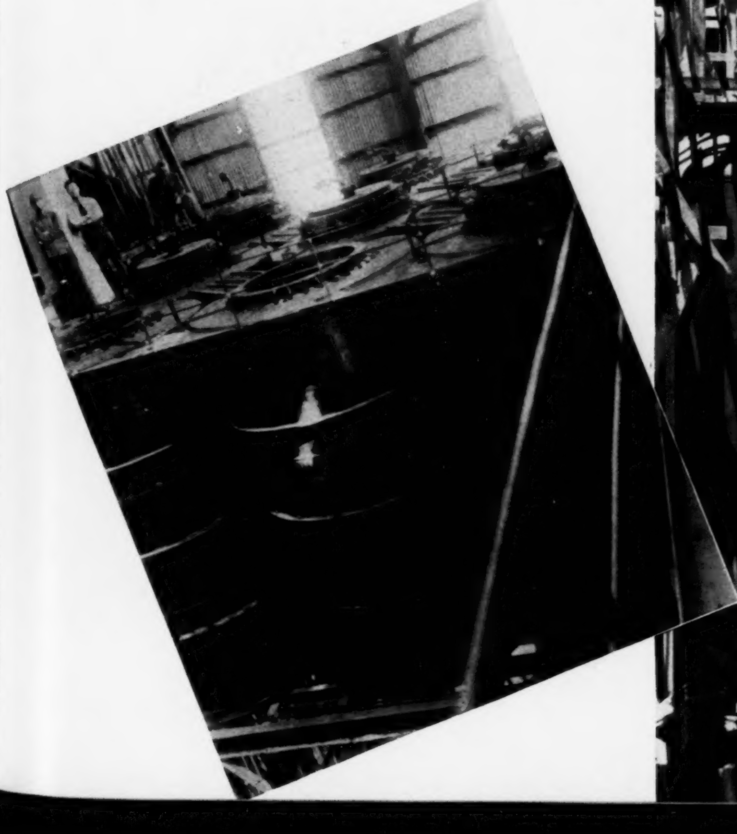
	KWH/KG		KWH/lb
Reduction furnace	14.5	or	6.576
Distillation	2.5		1.134
Remelting	0.5		0.227
Maintenance of H_2 Supply	4.0		1.814
Auxiliaries	0.5		0.227
Total	22.0		9.978

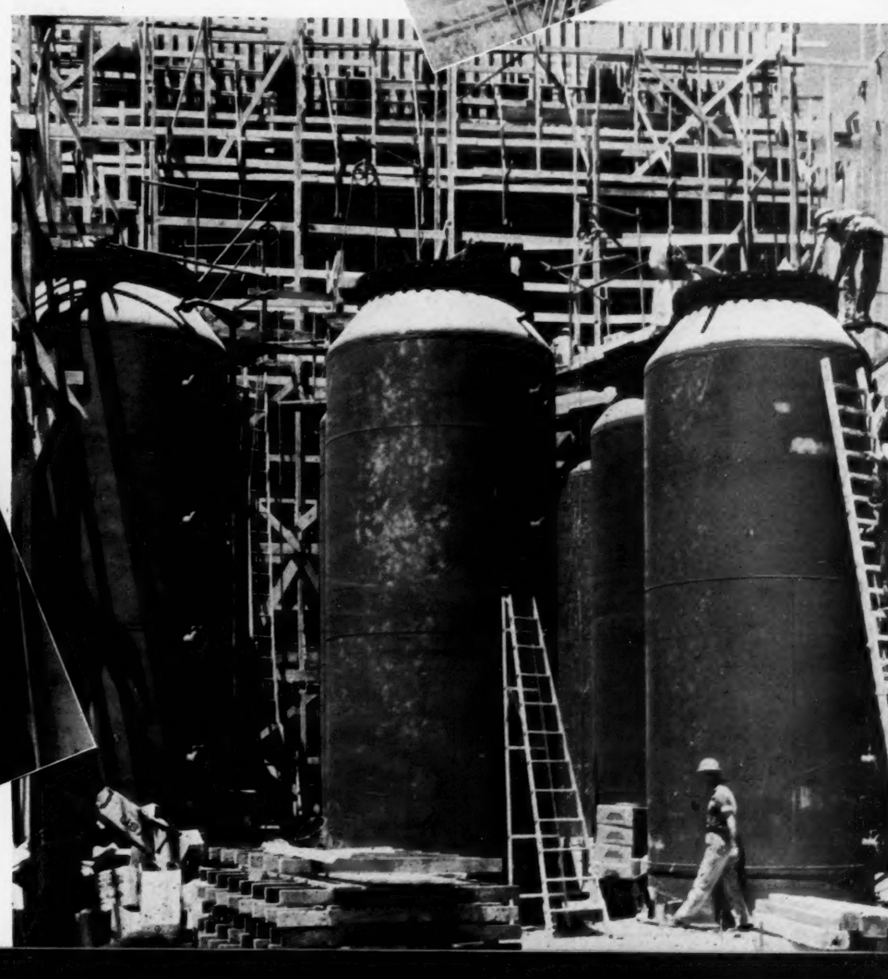
or approximately 20,000 KWH/ton

Gas: In case natural gas is used, the maintenance figure is reduced by 3 KWH per kilogram so that in such case the total KWH consumption is only 19. KWH per kilogram, or 8.64 KWH per pound.



Hansgirg Process; below, magnesium vacuum distillation furnace. Right, retort furnace from floor level, magnesium plant under construction at Permanente. Above, right, magnesium reduction furnace, 300 KVA, 1,000 tons per year *Courtesy, Dr. Hansgirg*





As a gas neutral to magnesium, hydrogen or hydrocarbon gases or vapors can be used. In certain combinations, also argon would be a suitable chilling gas.

Equipment: Kilns are required to calcine the magnesite to MgO, but for magnesium metal production it is not necessary to burn to dead-burned magnesia as is necessary for refractory purposes. For the magnesium reduction it is only necessary to remove from the magnesite the carbon dioxide content to an ignition loss of 0.2 percent, but it is not necessary to produce a fused clinker. Three-phase electric furnaces up to 3,000 KVA, with carbon lining, are in use.

The furnaces at Permanente will have a capacity of 8,000 KVA and furnaces with 12,000 KVA are under design. These furnaces must be entirely gas tight and stand an internal pressure up to 3 feet water column.

If hydrogen is used as a chilling gas, equipment is necessary to remove the carbon monoxide from one part of the hydrogen in circulation from 7 percent down to 1 percent which can be easily accomplished by washing the gas with ammoniacal copper solution.

Bureau of Mines
State College of Washington Process

In 1936 the U. S. Bureau of Mines and the Mining Experiment Station and State Electrometallurgical Research Laboratories at the State College of Washington, Pullman, Washington, began studying the Hansgirg process of electrothermal reduction of calcined magnesite with the idea of adapting it to the large quantities of low grade magnesite available in northeastern Washington, chiefly in Stevens County.

A multi-stage flotation process was developed by Mr. H. A. Doerner, U. S. Bureau of Mines, to concentrate the low grade magnesite ores to satisfactory low silica and low lime contents. This process consists of the use of cationic and anionic collectors in successive steps and results in a final tailing containing less than 25 percent of the original feed. This alternate use of cationic and anionic collectors in successive steps seems to be new in the mining industry and may have important applications for complex ores other than magnesite. (21) (37)

A semi-commercial scale pilot plant has been built and is in operation at Pullman, Washington, to gather the data for a large scale commercial plant.

The most important deviation from the Hansgirg process is perhaps the substitution of a cold oil spray for the large volumes of pure hydrogen gas (50 to 100 volumes per each volume of furnace exit gases) which was used to "shock-chill" the mixture of hydrogen, vaporized metallic magnesium and carbon monoxide to a safe point below the temperatures of rapid recombination in the reversible reaction. Doerner and his associates from the U. S. Bureau of Mines and from the State Electrometallurgical Research Laboratories, claim that this substitution avoids the large and undoubtedly expensive equipment needed to produce, handle, and repurify the large volumes of hydrogen containing carbon monoxide reported used in the Hansgirg process. Also, by applying a protective oil film from the point of exit from the furnace, they claim to have achieved almost complete elimination of the danger of explosion while handling the violently pyrophoric magnesium vapors and powder. Any contact of this powder with the air must be carefully avoided throughout its separation from the furnace exit gases, subsequent collection, conveyance briquetting and final purification by vacuum redistillation. (35) (37)

The oil finally developed for this "shock-chilling" spray consists of 1 part of oil (SAE 10) to 8 parts gasoline, and allowed a reduction in volume required of from 72 to 1 over oil alone. By using this light distillate blend, less than 1 gallon is required per pound of metal reduced in contrast to about 700 cubic feet of hydrogen reported used in the Hansgirg process.*

Lack of information concerning the foreign technique forced the Bureau investigators to develop the following details of equipment and procedure:

1. A gas tight arc furnace designed to operate at more than 2000°C.
2. Selection of refractories capable of resisting chemical or physical disintegration at 2400°C. and of providing adequate thermal and electric insulation.
3. A hydraulic feeder to inject a pulverized mixture into the furnace at a controlled rate through a feed port that must be kept sealed to prevent escape of the gaseous reaction products.
4. For satisfactory continuous operation, regulation of the power input to the arc furnace to produce a reaction rate exactly equivalent to to the rate at which feed is supplied. A variable reactor to regulate the power input was designed and constructed, and a pyrometric method of control has been developed.
5. A special spray nozzle to atomize the oil.
6. Control of the temperature in the separator by regulation of the rate at which the oil is circulated.
7. A special cyclonic separator to remove condensate from the gaseous products.
8. Development of a continuous, two-stage distillation furnace to recover oil and refined metal from the crude condensate.
9. A large number of auxiliary devices.

Process and Equipment. The small experimental furnace used 110-volt alter-

* Dr. Hansgirg states that the amount of hydrogen required for chilling is only 41 cubic meters per kilogram.

Looking into one of the retort furnaces at Permanente, Calif.

TABLE 9.
Production of Metallic Magnesium

Operation Details	Electrolytic Processes: Chloride °	Electrolytic Processes: Oxide °	Electrothermal Process: Recovery	Electrothermal Process: Refining by vacuum distillation
Raw material	Anhyd.$MgCl_2$	MgO	92% calcined magnesite	90 – 95% Mg.
M.P. material-°C.	$MgCl_2$ 708	MgO 2800		
M.P. metal-°C.	Mg 651	Mg 651 (bp.1120)		
Bath material	$MgCl_2$+NaCl	MGF_2-BaF_2+NaF MgO+C		
Furnace:				
Shape	Rectangular	Rectangular		
Shell	Steel	Steel		
Anode arrangement	Suspended vertically	Suspended vertically		
Material	Graphite	Carbon		
Cathode material	Steel pot	Steel		
Voltage across cell	6 – 9	9 – 16		
Amperage of cell		9,000–16,000		
Current density, amp. sq. in.	16–35	<40		
Operating temp.-°C.	670–730	950	2200–2300°C	600° @ 0.5-0.15 mm.hg. **
Conc. raw mtl. in bath		0.1% MgO @ 950°C		
Raw mtl. consumption/lb Mg	4–5 lbs $MgCl_2$	1.7 lbs MgO*		
Current efficiency	70 – 80%	50 – 60%		
Energy efficiency	20 – 30%	10 – 20%		
Energy consumption/lb Mg	8–13 kwhs.	14 – 25 kwhs.	10 kwhs.	3.2 kwhs. (80% on MgO)
Metal recovery on charge			80 – 90%	98%
Purity of Product	99.9–99.95%	99.8%	60 – 70%	99.99%

* Carbon consumption 0.5 lb/lb. Mg.
** For 5-6 hours.
° Mantell, Dr. C. L., "Industrial Electrochemistry, 1940."

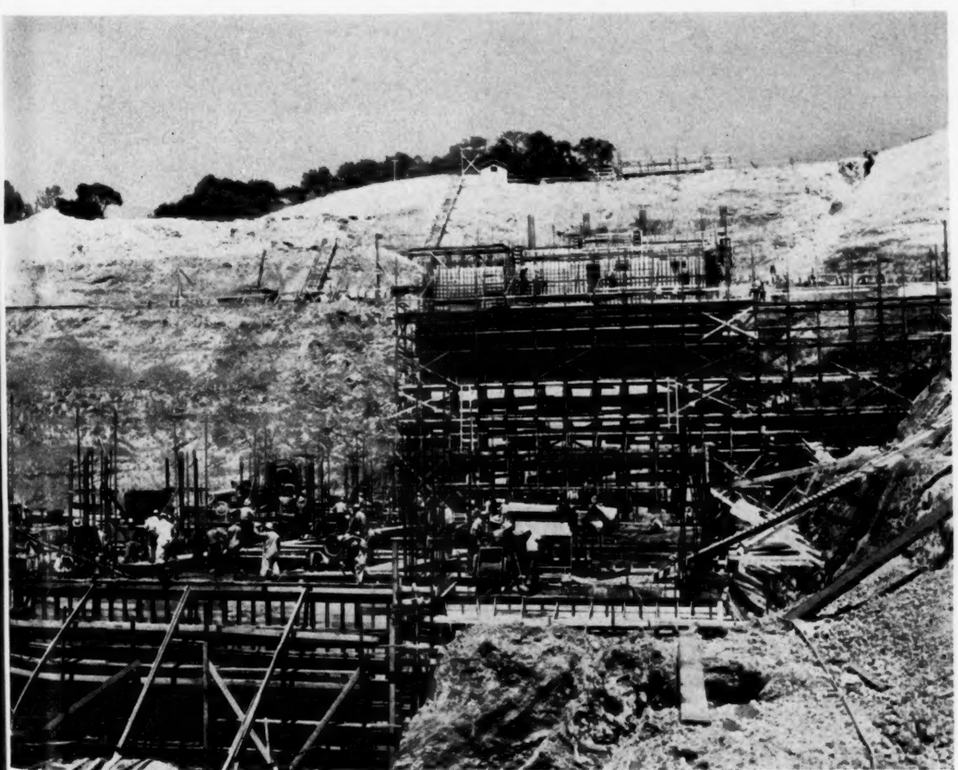
nating current power supply with a reactor giving adequate regulation to an arc having 35 to 40 volts drop at a maximum current of 450 amperes, using parallel connection. An arc between two vertical graphite electrodes heats the reaction chamber. The lower electrode is hollow so that it serves as a port through which the mixture of magnesia and coke is introduced continually into the arc by an hydraulic ram.

With a power input of 13.5 kilowatts, the furnace reaches a temperature of 2000° C. in about 30 minutes. The feed is slow at first but when the reaction chamber temperature reaches 2000° C. the feed is stepped up gradually to 2400 grams of mixture per hour. At that rate, the endothermic heat of reaction aids in holding the retort temperature close to 2000° C. while allowing the power input to drop to 12.4 kilowatts.

The gaseous reaction products leave the furnace at high velocity through a flue and are chilled instantaneously by the distillate oilspray in the water-cooled exit tube which projects into the shell.

The chilled gases (still between 200° C. and 400° C.) are passed into a scrubbing mechanism consisting of a series of baffles and fan blades intended to separate solids and oil at a temperature above the dew point of the gasoline (about 200° C.) and then to a water-cooled condenser to remove gasoline from the residual carbon monoxide gas.

Retort and furnace buildings under construction at Permanente with nitrogen plant structure on uppermost level. Furnaces will have 8,000 KVA capacity



The condensate was then centrifuged to thicken the oil-soaked "mud." This mud becomes the feed of the redistillation furnace where the oil is first removed by distillation at 500° C. The residue from the oil-distillation furnace (small pyrophoric lumps containing approximately 50 percent Mg, 23 percent C, and 21 percent MgO) becomes the feed of the redistillation retort (an electrical resistance gas-tight furnace) which operates at about 1000° C. A stream of hydrogen (or helium) gas carries the metal as vapor through the exit ring and into the condenser, and bubbling through a molten pool of metal which collects and overflows through a tube as drops of metal to collect in a kerosene reservoir.

A conversion of magnesia to metal of 75.1 percent was realized.

On the basis of conversion, the power used was 7.8 kilowatt hours per pound of metal produced.(37)

This 7.8 kilowatt hours no doubt covers only the reduction stage and 3.2 kilowatt hours more must be added to cover the purification by redistillation for an overall approximate figure of 11 kilowatt hours per pound of pure metal produced.

It is interesting to compare this pilot plant figure with the comparison given by Dr. C. L. Mantell in his "Industrial Electrochemistry," 1940 edition, in a tabular analysis of the two electrolytic processes (see columns 2 and 3). To this has been added (columns 4 and 5) some data on the Austro-American Magnesite Company's electrothermal process (Hansgirg) and on the refining by vacuum distillation. This comparison is given in Table 9.

Description of Bonneville-Grand Coulee Power Resources

In view of the announced intention of the Federal Government to place plants for greatly increased aluminum and magnesium production near immediately available sources of large blocks of low cost

TABLE 10.

Bonneville Power Administration
Market Development Section
Recommended Installation Schedule for Generators at Bonneville and Grand Coulee
(Estimate of June 4, 1941)

Anticipated Date of Installation	Units Added: Bonneville Nos.	Units Added: Grand Coulee Nos.	Total Installed Capacity (KW): Bonneville	Total Installed Capacity (KW): Grand Coulee	Total Installed Capacity (KW): Total
Present Instal.	1–4 inc.		194,400		194,400
Aug. 1, 1941		L3[1]	194,400	108,000	302,400
Aug. 18, 1941	5[1]		248,400	108,000	356,400
Dec. 1, 1941		L2[1]	248,400	216,000	464,400
Jan. 1, 1942	6[1]		302,400	216,000	518,400
Mar. 1, 1942		L1[1]	302,400	324,000	626,400
Jan. 1943	7[2]		356,400	324,000	680,400
July 1943	8[2]	L4[3] & R1	410,400	540,000	950,000
Sept. 1943	9[2]	L5[3] & R2	464,400	756,000	1,220,400
Nov. 1943		L6[3] & R3	464,400	972,000	1,436,400
Dec. 1943	10[2]		518,400	972,000	1,490,400
Jan. 1944		L7 & R4	518,400	1,188,000	1,706,400
Mar. 1944		L8	518,400	1,296,000	1,814,400
May 1944		R5	518,400	1,404,000	1,922,400
Sept. 1944		L9	518,400	1,512,000	2,030,400
Mar. 1945		R6	518,400	1,620,000	2,138,400

1/ Under construction.
2/ Funds appropriated and foundations under construction.
3/ Now under bid. Other generators at Grand Coulee awaiting Congressional action as recommended in this schedule.
Note: Schedule based on best construction and installation information as of date. Subject to revision as conditions warrant.

power, the following description of Bonneville-Grand Coulee power resources and schedule of availability are considered timely.

General Description

Bonneville and Grand Coulee dams are the first of a series of dams proposed for the Columbia River.

Bonneville dam, located 40 miles to the east of Portland, Oregon, was constructed by the U. S. War Department, Corps of Engineers, as a navigation and power project providing for deep-draft navigation up to The Dalles, Oregon, 187 miles from the Pacific Ocean, and for an ultimate power capacity of 518,400 kilowatts. Of the proposed dams, it is furthest downstream and is at tidewater.

Grand Coulee dam, located approximately 70 miles northwest of Spokane, Washington, and approximately 600 miles upstream on the Columbia River from the Pacific Ocean, is being constructed by the Department of the Interior, Bureau of Reclamation, as an irrigation and power project, to provide water for some 1,250,000 acres in the state of Washington, and for an ultimate power capacity of 1,944,000 kilowatts. Of the proposed dams, it is furthest upstream.

The Bonneville Power Administration is the federal agency entrusted with the construction of a regional power network and the sale of power therefrom. The initial regional network shown on the attached map consists of high-capacity, high-voltage lines with substations at numerous locations.

Both the Bonneville Power Administration and the Bureau of Reclamation are agencies of the U. S. Department of the Interior. Power from both dams will be available in the region from the new transmission line between Bonneville and Grand Coulee dams.

The tentative schedule of generating capacity on the federal Bonneville-Coulee power system is as given in Table 10.

Power on the regional network is available on a wholesale basis to retail distribution systems, although under certain conditions power also may be purchased directly by industrial consumers with large, high load factor requirements.

The wholesale price of prime power is based upon rate schedules and general terms and conditions which have been approved by the Federal Power Commission: (Below is a brief summary of Schedule of Rates and Conditions.)

Schedule A-1 (At Site Prime Power)—available for direct consumption within 15 miles of the Bonneville project power plant—
$14.50 per kilowatt-year
(1.65 mills per kilowatt-hour at 100% load factor)

Schedule C-2 (Transmission System Prime Power)—available on transmission system—
$17.50 per kilowatt-year
(2.00 mills per kilowatt-hour at 100% load factor)

Schedule F-1 (Optional Prime Power)
Demand charge—75c net per month per kilowatt of billing demand
Energy charge—2.5 mills net per kilowatt-hour delivered

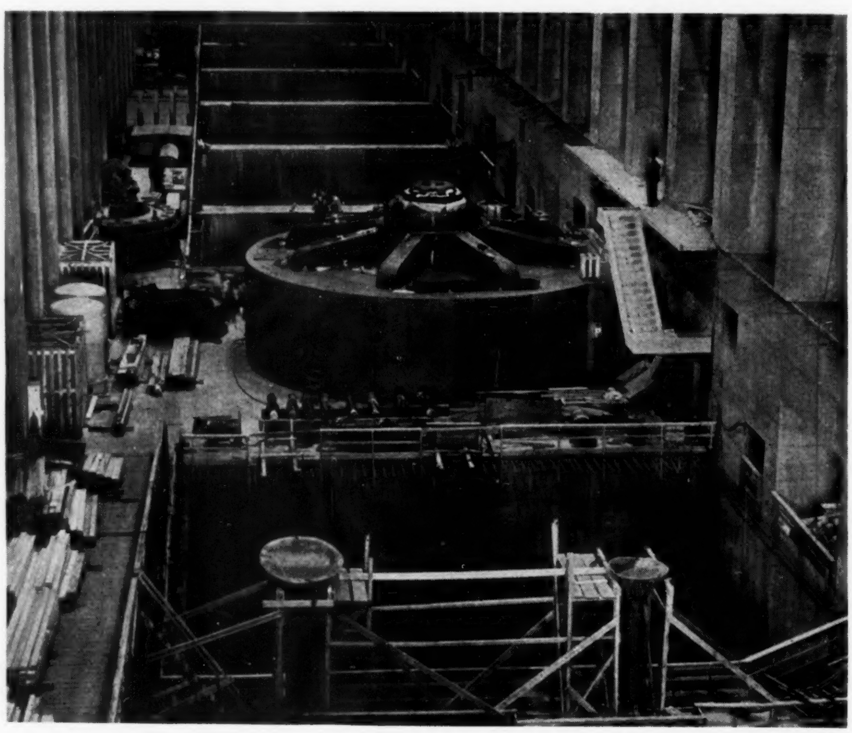
Schedule H-1 (Dump Energy)—when available, and at the discretion of the Administrator
2.5 mills net per kilowatt-hour delivered.

The Bonneville Power Administration's Market Development Section maintains a technical staff whose services are available to industry for information on Northwest raw materials and processes applicable thereto. Various data and reports are obtainable on request to the Market Development Section, U. S. Department of the Interior, Bonneville Power Administration, Portland, Oregon.

Conclusions

The basic importance of magnesium is that it is a third lighter than aluminum and forms extremely strong alloys which retain in large part this advantage of light weight.

The keen interest of the commercial



First of three identical 108,000-kw Westinghouse generators which will supply power over the Bonneville power transmission line. Grand Coulee power plant ultimately will have in it 18 such generators powered by water

airlines in taking every safe means to reduce the "dead-load," or gross weight of their transport planes, stems from the benefits thus achieved. Reductions in weight of the plane itself pay dividends: in reduced power consumption required to lift the plane off the ground and to fly; in better performance characteristics while in flight; and in the ability to carry great "pay-loads."

With regard to the last item the airlines have indicated that if each pound saved in the dead-weight of the plane were replaced by freight, or "pay-load," the value of this additional pound of freight-carrying ability would amount to $76.00 per year, or $760.00 over the estimated 10-year useful life of the plane.

Better Maneuverability

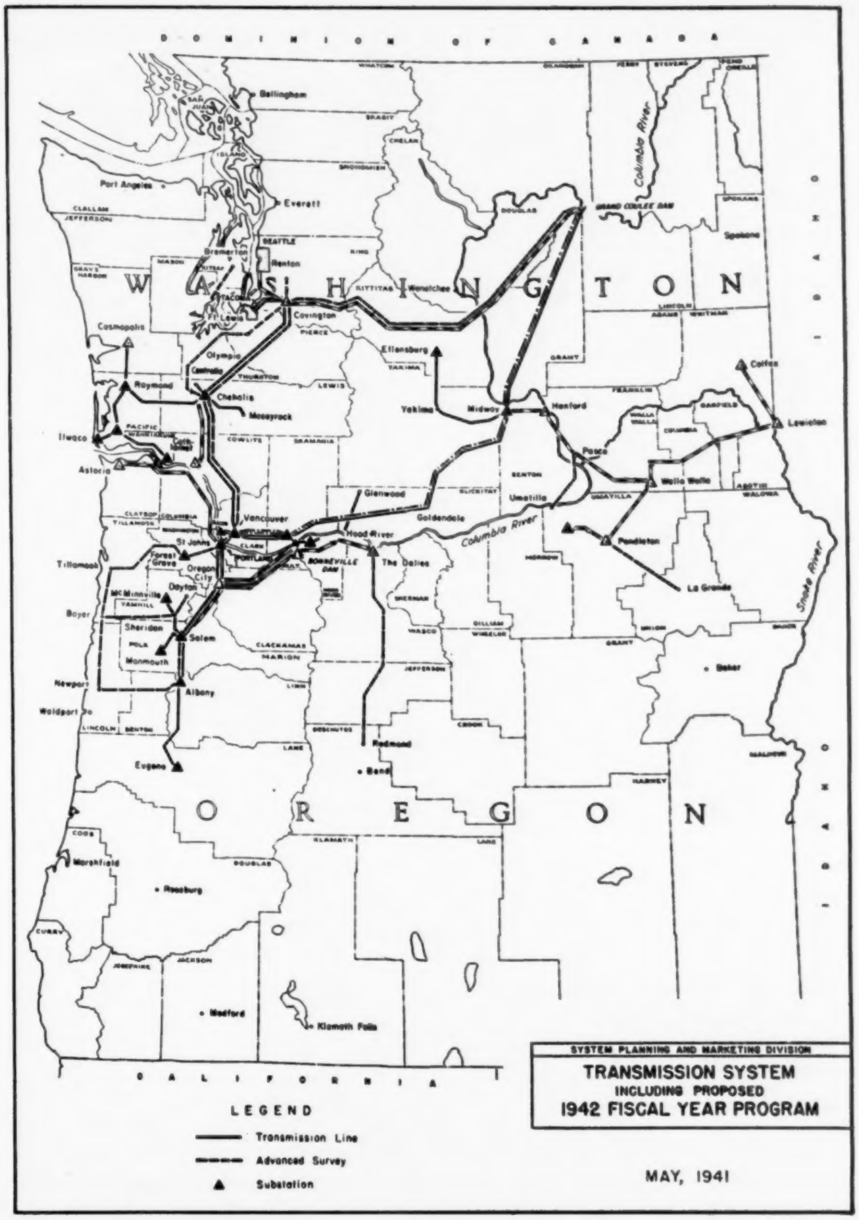
To the Army Air Corps reductions in the dead-weight of their planes means increased rates of climb, better performance, vastly improved speed and maneuverability — items so vital to the success and survival of the pilot in combat.

A. W. Winston, Metallurgist of Dow Chemical Company credits primarily the new high-strength magnesium alloys with making practicable military plane speeds of 400 miles per hour and upwards. (13)

On the Pacific Coast as 1941 began, 78,600 men were working in aircraft factories whose floor space amounted to 8,759,000 square feet, or 62 percent of the men and 65.7 percent of the nation's factory floor space. (38) West Coast aircraft campanies include Boeing, Consolidated, Douglas, Lockheed, North American, Northrop, Ryan and Vultee. Kinner and Menasco make aircraft engines on the Pacific Coast.

Now that the Aluminum Company of America has a plant at Vancouver, Washington, using 180,000 kilowatts of Bonneville-Grand Coulee power to produce approximately 200 million pounds of aluminum ingot, and Reynolds Metal Company's plant at Longview, Washington, will soon be ready to take 60,000 kilowatts more to produce an additional 60 million pounds of aluminum ingot all for our aircraft industry, it is highly desirable to invite the companion magnesium industry to join these two in the Columbia River area to serve better the aircraft industry in its national defense efforts.

The Pacific Northwest offers very abundant supplies of raw materials, excellent plant sites near the Bonneville-Grand Coulee power network and on tidewater suitable for coastwise water shipment of the finished rolled, extruded or cast structural parts. In addition, five transcontinental railroads serve the Pacific Northwest. Such a plant would be as strategically located between Boeing in Seattle, Washington, and the California aircraft factories as sources of cheap power will permit.



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Personalities in Chemistry
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Ph.D ORGANIC CHEMISTRY
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IRVING ELKIN MUSKAT

IRVING ELKIN MUSKAT, at age thirty-five, already has carved for himself an enviable niche in the history of industrial chemistry. He is at home in the executive office as well as in the classroom and the laboratory. His contributions to science and technology have ranged from studies in medicine to the unromantic, yet all important, introduction of quality into a chemical industry where quantity and price previously had reigned supreme.

By

A. D. McFadyen

Muskat was born on December 25, 1905, and received his primary training in the public schools of Parkersburg, West Virginia, and Marietta, Ohio. He entered Marietta College in 1920, graduating with an A.B. degree in 1924. During the same year, he began his graduate work at the University of Chicago, receiving the Masters degree in 1925, and Doctorate degree from the same institution in 1927. While at the University of Chicago, he came into contact with the late Professor Julius Stieglitz, one of the outstanding teachers and scientists of America, who influenced him profoundly. Under the tutelage of Stieglitz, Muskat acquired that breadth of vision so necessary in scientific endeavor. After a short period in the consulting laboratory of Mariner and Hoskins, of Chicago, Muskat returned to the University of Chicago in January, 1928, as an instructor in Chemistry, and research assistant to Professor Stieglitz. Independently, he initiated an investigation on the chemical reactions of organic compounds containing a conjugated system of double bonds, and published a series of articles on the subject. Methods were developed by him for the preparation of butadiene and its substituted derivatives. Part of the fundamental basis on which rests the chemistry of the butadiene-type synthetic rubbers was disclosed in this work. In September, 1930, Muskat joined the staff of the Century of Progress Exposition in Chicago as director of chemical exhibits. He developed for the Exposition a program designed to demonstrate, by means of dynamic exhibits, fundamental chemical phenomena as well as the application of these principles to the chemical industries. His planning of displays on the chemistry of petroleum, rubber, foods, synthetic chemicals, electrometallurgy, etc., aroused in him an intense interest in the future of industrial chemistry. Here also was developed his flair for presentation of scientific subjects to non-technical men in forceful, yet simple terms.

After completion of the Exposition, Muskat joined the Rockefeller Institute of Medical Research as a Fellow of the National Research Council. Here his principal research work concerned the chemistry of carbohydrates. In the course of this work he developed a new method for the alkylation of carbohydrates in liquid ammonia solution, which is now in general use.

Joining the Gulf Research and Development Corporation in 1934, Muskat organized the refining research phase of the Harmerville Laboratory of the Gulf Company, and initiated a research program on gasoline inhibitors, polymerization of olefines for the production of high-octane gasoline, corrosion inhibitors for oils, acid treatment and oxidation of petroleum distillates, etc.

Late in 1935, Muskat left the Gulf Company to assume the post of Director of Research for the Columbia Chemical Division of the Pittsburgh Plate Glass Company, at Barberton, Ohio. Under his direction, a broad program of research was organized, covering not only the products of the Division, but an enlarged field of investigation as well. The productivity of his organization is best attested by the fact that within five years, the physical facilities of the group have been expanded twice to a size more than four-fold the original laboratory, while the staff has grown from a handful of men to well over 100 technically trained workers. Pilot-plant activities have also been added to the work of the group, indicating the scope of the investigations undertaken.

At the Pittsburgh Plate Glass Company, in a field essentially foreign to his previous experience in synthetic organic chemistry, Muskat applied himself to the problems of the alkali industry. His first major development was the novel use of liquid ammonia for the purification and concentration of caustic soda. This process is now in use in large scale commercial operation for the purification of diaphragm electrolytic caustic. By ingenious application of phase-rule studies on the system involved, the process was further improved to give proof of his belief in being his own best competitor. A process for the purification of lime soda caustic has also been developed and placed into commercial operation. Methods of concentrating and handling the purified material followed quickly, and the development of a paint stable toward concentrated caustic soda at elevated temperatures enabled consumers to be assured of a constant supply of material of uniformly high quality. Thus, within a very short space of time, his contributions to the alkali industry made possible the shipment of high quality caustic soda dissolved in a minimum quantity of water to its destination without contamination.

Invasion of the metallurgical and pigment fields quickly followed, with the continued flow of patents issued bearing witness to his developments in these fields. Under his direction the recovery of metals and metallic salts and oxides from their

(Continued on Page 324)

Above, naval stores plant, Hercules Powder Co., at Brunswick, Ga. It is one of two Hercules plants.

The American Naval Stores Situation and Outlook

By J. E. Lockwood
Naval Stores Consultant

The American Naval Stores Industry has apparently reached a crisis in its development and progress and now faces serious problems, upon the proper solution of which may largely depend its future, is the opinion of J. E. Lockwood, Naval Stores Consultant of Savannah, Ga. A fuller expression of his views and reasons therefore follows.

THAT the Gum Naval Stores Industry now faces a serious situation with difficult problems to solve, appears evident. This is shown by the sharp advance on August 15th, in Savannah price of Gum Turpentine to 81½c per gallon in barrels, the highest price effective during the past fifteen years, and with an outlook for much higher prices before next season's production will become available. In consequence, the problems are, will the Government and Gum Industry allow the price of Gum Turpentine to go as high as possible, to get "all the traffic will bear," or will it forego possible present profit for possible future benefits. Also, will Gum production be increased during 1942, to increase the supply of Gum Turpentine, now low and decreasing, notwithstanding the excessive Gum Rosin stocks now on hand, which would thus be increased to possibly ruinous totals.

The present Gum Naval Stores situation is a natural result of the combination of conditions that have continued during the last three years, as the outcome of the Government aid program for the Gum Industry, during the depression that has continued since 1929. Previous to 1939 Government loans on Gum Turpentine and Gum Rosin production at artificial price levels, brought increasing Carryover stocks, which on March 31, 1939 had reached the unprecedented totals of more than 300,000 barrels of Turpentine and 1,600,000 round barrels of Rosin. Then, to prevent further increases in these price-depressing Carryovers, the Government loan program for the 1939-40 season, required a material decrease in the production of Gum Turpentine and Rosin. Also in 1939, the Gum Industry inaugurated its National Advertising campaign for increasing the consumption of Gum Turpentine, but made no corresponding effort for Gum Rosin. Naturally with the Government program decreasing the production of Gum Turpentine and Rosin, while the Gum Industry's Advertising was increasing consumption of Gum Turpentine, the total turpentine demand has at last caught up with the supply, and may practically exhaust all available supplies before next season's production becomes available. This evidences an unbalanced program for the price controlling stocks of Gum Turpentine and those of Gum Rosin. It makes very difficult, the problem of the Government and Gum Industry in determining what total Gum production for the 1942-43 season is warranted, with proper consideration for the future of the Gum Industry.

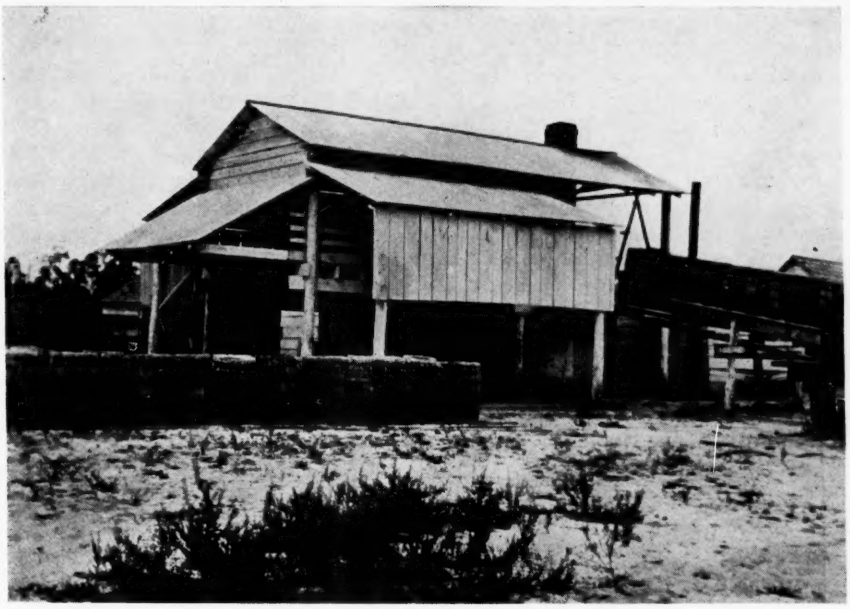
The Wood Naval Stores situation is quite different and its outlook very promising. The Wood Industry has so controlled its production as to practically balance the consumption of all of its products, while maintaining sufficient Carryover stocks to supply promptly

unusual requirements, without accumulating surplus stocks. This has been accomplished by fully developing markets for its primary products, and by research work on special products and derivatives. In consequence, its production capacity is insufficient to fully supply the total demand for its products and derivatives, so it is buying increasing quantities of Gum products for conversion into the special products and derivatives it has developed. Further, with a steadily increasing production of Wood products, it has gradually reduced their unit cost to levels that permit mutually satisfactory

	Turpentine		Rosin	
Season ended Mar. 31	Carryover U.S. & London	Sav. price per gal.	Carryover U.S. total	Sav. price H. Rosin
1941	209,910*	$.39½	1,874,160	$4.21
1940	220,267*	.31	1,567,396	5.50
1939	314,323	.29	1,621,070	5.70
1938	218,774	.23¼	999,347	4.80
1937	223,364	.36½	669,231	7.85
1936	236,136	.37¾	765,807	4.42½
1935	191,359	.47½	978,930	4.35
1934	132,265	.56	928,654	5.75
1933	136,813	.37¾	847,018	2.75
1932	141,169	.42	1,034,317	2.80
1931	139,817	.48¾	842,627	4.77½
1930	126,971	.51	608,578	7.32½
1929	116,726	.50½	576,204	7.80

* Turpentine stocks at London not available, for 1940 and 1941. The 1939 London stocks totalled 25,050 barrels.

Above Savannah prices of Turpentine is in barrels.



Above, general view of turpentine still. (Charles McCall, Tusculum, Ga.)

prices to both producers and consumers. The Wood Industry is therefore doing a sound and constructive work for the American Naval Stores Industry.

The Carryover stocks of Turpentine and Rosin, are the most important item of the entire naval stores situation, as they are practically the "key" to coincident price levels and trends, unless such economic result is deferred by financial support of artificial prices. These are shown at the close of each naval stores season on March 31, of the years given in the following list, which includes each of the years during the period previously referred to. As Carryover stocks of Wood Turpentine and Rosin are fairly constant at normal totals, and readjusted by the Wood Industry when desirable, whatever variation in total Carryovers are given below, are practically the variations in stocks of Gum products. Normal Carryovers for Turpentine in U. S. and at London are 125,000 barrels and for Rosin in U. S. 600,000 round barrels. All stocks above these normal totals, should be considered surplus stocks with practically all surplus stocks in Government hands and under C. C. C. control.

The above figures show a direct but inverse relation between the Carryover stocks and Savannah prices. This is due to the economic law of supply and demand. It also shows that increased stocks indicate a trend toward declining prices and vice versa. Also, that financial support of prices at artificial levels, defers but does not prevent the eventual working of the law of supply and demand. Further that the most effective means of securing a decrease in production is to allow the supply and demand prices to rule, without financial support of artificial price levels.

As the background of the American Naval Stores Industry is needed, to properly consider its conditions and problems, also to evaluate the developments mentioned, the following brief summary of past conditions and developments is supplied. It covers both Gum Naval Stores and Wood Naval Stores conditions, also the problems of the Naval Stores Industry as a whole.

First and oldest is the Gum Naval Stores Industry. It has been the chief source of the World's supply of turpentine and rosin for more than a century. And, for more than half a century, it has provided the daily official Savannah prices of Gum Turpentine and Gum Rosin, on which their prices and all other market centers have been based. While the organization and operating methods of the Gum Industry are open to criticism, yet as they have proven sufficiently satisfactory to all concerned, to have continued in use so long, in consequence the Gum Industry has been slow in materially changing same, with a view of getting in line with the modern policy and methods that have made American industries World leaders.

The organization of the Gum Naval Stores Industry consists of four classes, viz.

First. Land Owners whose pine timber yields the crude gum from which Gum Turpentine and Gum Rosin are produced. Only a few of the Land Owners work their own timber for turpentine gum. Nearly all lease their timber to Gum Producers, usually for four years or thereabouts, either at a fixed price or on a percentage-of-the-net-cash-returns basis.

Second. Gum Producers, whose timber leases and production operations are usually financed by Naval Stores Factors, who acting as agents, sell their products for spot cash on the Savannah market, or to Naval Stores Dealer-Exporters. With but few exceptions, producers ship and Factors sell Gum products weekly and monthly as produced.

Third. Naval Stores Factors, whose loans to Gum Producers provide most of the capital invested in Naval Stores production operations. Their advances cover timber leases, Gum production equipment and provide for operations with necessary supplies. From the Gross Cash Returns realized from sales of each producer's products, they deduct their sales commission with other charges, and credit the Net Cash Returns to the Producer's account.

Fourth. Naval Stores Dealer-Exporters, who provide the permanent spot cash Savannah market for daily sales of turpentine and rosin offered, which they buy, store and accumulate in Storage Yards, where sufficient stocks are carried to provide for prompt shipments in small or large quantities as desired by local distributors and ultimate consumers, also for export shipments. This requires considerable capital and credit. This method of marketing, necessitates Dealer-Exporters accumulating large stocks of Gum turpentine and Gum rosin, at sufficiently low average prices, so that with added storage and insurance costs plus selling and overhead expenses, they may sell later at suf-

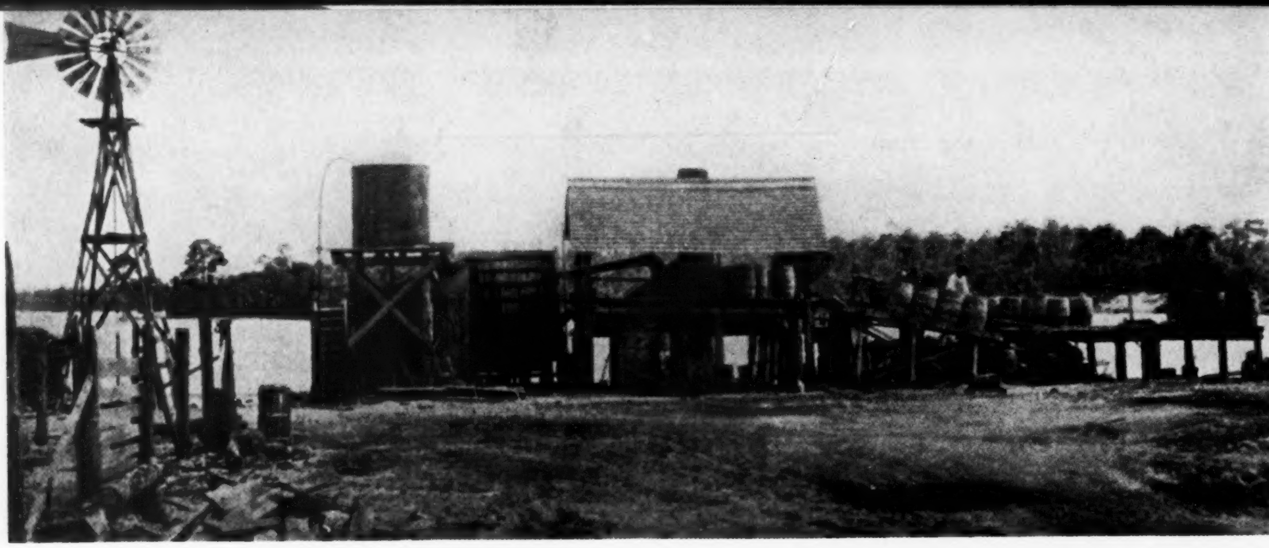


Fig. 1. An old-style gum still of the type that has been in use for more than a century, with but minor improvements.

ficiently higher prices to yield a fair net profit. It is necessarily based upon speculation. It may eventually show a net loss, or fair profit, or under unusual trade conditions may show heavy losses or unusually large profits. It is not suitable for stabilized prices.

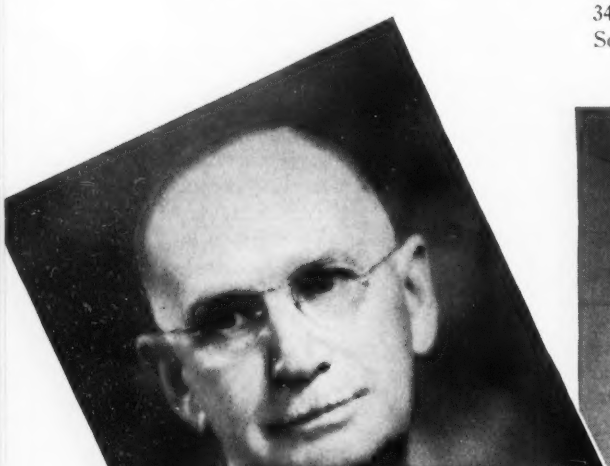
It will be noted, that the Gum Naval Stores Industry lacks any complete vertical organization, covering all of its operations from securing its raw material to the delivery to ultimate consumers of its finished products. That is its fundamental weakness. That lacks conditions of sufficiently large and permanent investments of capital, to render advisable the policy of "more and Better Goods at Lower Cost" as adopted and announced by the American Chemical Industry.

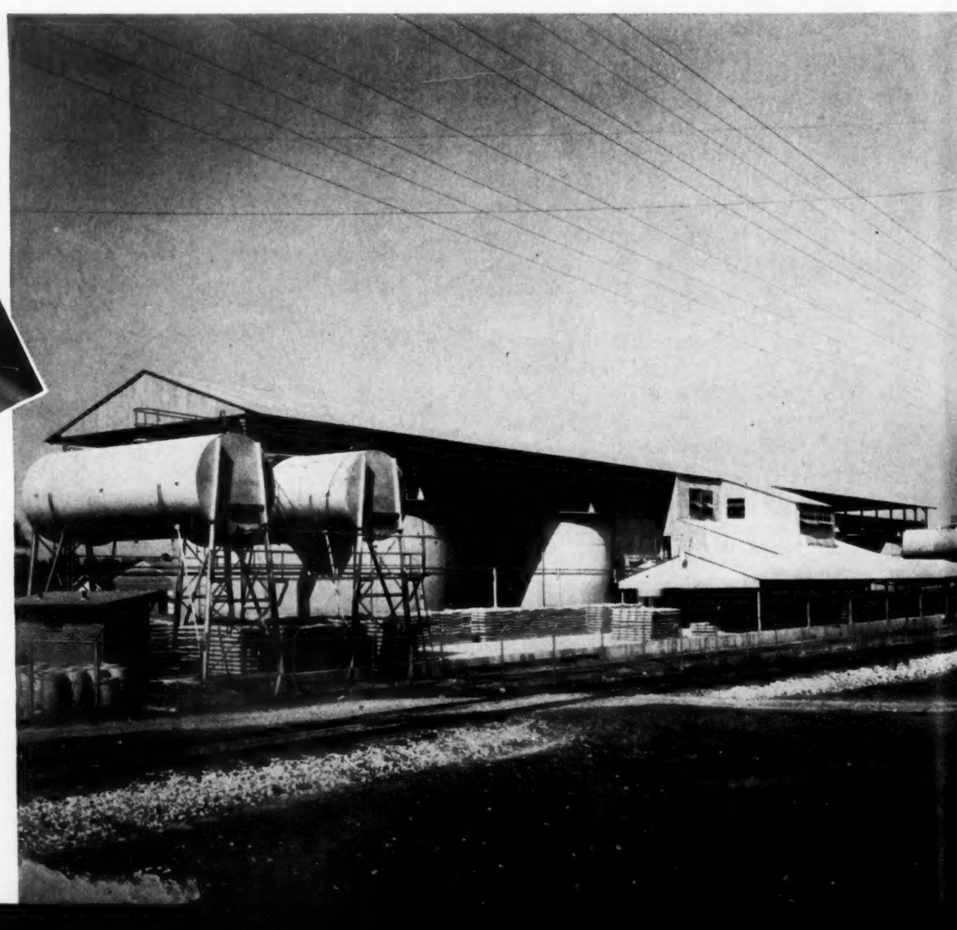
Other conditions that have an important bearing on the program of the Gum Naval Stores Industry, include the following:

The number of pine timberland Owners is very large, and their acreage varies from hundreds to hundreds of thousands. Their interests in Forestry are based upon actual or potential per-acre total annual returns, which usually show about 60 per cent from Naval Stores, and 40 per cent from saw-logs, poles, piling, pulpwood and other forestry industries. It is therefore evident that this class which controls the source from which crude turpentine gum is obtained, have other interests to consider in planning their Forestry program and operations thereunder.

The Number of Gum Producers is also large and their average Naval Stores production quite small. The canvass of 1933-34 Gum production made by U. S. Forest Service, showed that slightly more than 13,000 Gum Producers were operating that season. Mostly their production was small, many shipping to markets yearly only 10 barrels or less of Turpentine with a corresponding production of Rosin. Less than one half shipped from 11 to 100 barrels of Turpentine, while only a few shipped more than 500 barrels. While the larger Naval Stores Producers have few if any other interests, yet the great number of small Gum Producers are farmers whose chief interests are in other crops and their Gum production is only to supplement their cash income.

The number of Stills which produce Turpentine and Rosin from Crude Gum is also large and their average production small. For the 1933-34 Gum production approximately 1200 Gum Producers also operated stills. They "stilled" their own crude gum, also crude gum produced by smaller producers. Almost all of these Stills were of the old type first intro-





Above, J. E. Lockwood. Right, a central gum distilling plant of the Nelio Resin Processing Corp., Valdosta, Ga. Its capacity is approximately 100 times that of the average style gum still. (Fig. 2)

duced in 1834, consisting of a simple Copper Still and Worm Condenser, of capacity for stilling 20 to 25 barrels of crude gum at a charge and usually running about two charges per day on two days per week. This primitive type of Still, has been used by the Gum Industry for more than a century, with but minor improvements in construction and operating methods. It is not suited to the production of any special products or derivatives. The average annual production of each Still of this type, is about 300 Units, each consisting of 1 barrel of Turpentine and 3⅓ barrels of Rosin. Figure 1 shows a typical still of this type.

A few large Central Gum Distilling plants have gradually come into use during the last ten years. One of these is shown in Figure 2. This is the Valdosta, Ga., Plant of the Nelio Resin Processing Corporation, which has a duplicate plant in Jacksonville, Fla., and plans to build a third in Savannah, Georgia, as soon as the necessary materials and equipment can be obtained. The plant shown has an annual capacity for distilling 150.000 barrels of crude Gum in the production of 30,000 Units of Gum products. Several other Central Gum Distilling plants are in operation at other locations. All together, these Central Gum Distilling plants probably account for from 20 to 25 per cent of our total Gum Naval Stores production. As they are large and well equipped, they are suitable for the production of improved and special Gum products and derivatives, when developed by necessary research and market developments.

A typical Storage Yard used by Naval Stores Dealer-Exporters is shown in Figure 3, this being the principal one used at Savannah, Ga. Other Storage Yards are located at other Southern Ports long used for Naval Stores, and additional Storage Yards established at various

Fig. 3. Rosin yards at Savannah, Ga.

Interior concentration points during the last ten years. These Storage Yards carry stocks of Gum Turpentine and Gum Rosin owned by Dealer-Exporters, also those accumulated under Government loans, now under the control of the Commodity Credit Corporation. Practically all "surplus stocks" of Gum Turpentine and Gum Rosin are now held by the C.C.C. at various Storage Yards mentioned.

Another and increasingly important condition of the Gum Industry, is the Government Naval Stores Program, that has been gradually developed during the last eight years. Under this program, by means of loans on Gum Turpentine and Gum Rosin produced as required, made at artificial price levels, the practical control of Gum Naval Stores production is effected. By cooperation between the Government and the American Turpentine Farmers Association Cooperative—the Gum Producers association—the size of the Gum crop is determined and price basis for loans on Gum production agreed on for each season in advance. This relatively new condition is an important one to the Gum Industry, particularly at present, in view of the excessive surplus stocks of Gum Rosin, and their price-depressing influence on Savannah Rosin prices. What Gum production for 1942-43 season will be warranted and possible, is a difficult problem for the Government and Gum Industry to decide.

The background of the Wood Naval Stores Industry is much briefer and simpler, with at present no difficult problems apparent. This industry dates from 1910, when Wood Rosin was first commercially produced, together with Steam Distilled Wood Turpentine and Pine Oil. Due to preliminary investigations made of production problems, also of distribution and consumption, it proved successful from the start. The organization then adopted and still generally used by the Wood Naval Stores Industry, was a simple but comprehensive one, covering all operations from securing the raw materials to delivering the finished products to ultimate consumers. In consequence, the Wood Naval Stores Industry has from its start, endeavored to improve its products and lower their consumer prices, while carrying on research work and market developments including new uses. This program has brought a steady increase in total production of Wood products, as new uses and special products and derivatives have been developed and made available. Since 1920 when Hercules Powder Company and others entered this field, the progress has been more rapid, especially after Pale Wood Rosins, were made available. Page 316 shows the Brunswick, Georgia, plant of Hercules Powder Company, one of the World's largest Naval Stores plants. That it makes possible the production of a great variety of standard and special naval stores products and their derivatives, is evident from its appearance and record. Such developments in naval stores are important to the entire American Naval Stores Industry.

World War developments are another important item of the present situation and outlook. Exports of American Naval Stores have decreased materially and the outlook is uncertain, under War conditions. Notwithstanding Foreign naval stores production having been materially decreased by War activities and policies, yet shipping conditions and foreign import restrictions have prevented our supplies making good any lack of their own. However, as Britain is reported as requesting shipment before June 1, 1942, of 90,000 barrels of Turpentine and 250,000 barrels of Rosin, under our Lease-Lend Act, this movement if made, may serve to increase our total exports of naval stores, during that period.

From the foregoing it should be clear, that our Gum Naval Stores Industry, is now facing a situation that has in part been gradually developing ever since Wood Rosin was first produced in 1910, and in part has resulted from the combined effects of Government control of Gum Turpentine production and the Industry's Turpentine Advertising campaign.

For Turpentine the problem is, whether to allow Savannah prices to go as high as possible, so as to profit by "all the traffic will bear" and thus lose much of the good will developed by the Advertising campaign, or to forego possible present profits for possible future benefits and thus protect the good will developed at great expense

For Rosin, the problem is largely one of preventing further increase in present excessive Carryover, and if possible bring about some decrease, or let the Rosin Carryover, increase whatever it may, if Gum production is increased for the 1942-43 season, to increase the supply of Gum Turpentine.

These are problems for both Government and Gum Industry to consider and agree on. To what extent and in what respects the War developments may affect our Naval Stores situation, it is as yet impossible to judge. Our present Carryover of Rosin is equivalent to 12 months supply at the 1940-41 rate of total demand, as compared with normal Carryover under pre-war conditions of 3 months supply. It would seem a conservative program to not materially increase present Rosin Carryover, as should the War end soon, which appears improbable, the post war, requirements could then be determined and provided for while world trade is returning to the new conditions that develop.

AN ECONOMIC and TECHNICAL Review of Oils and Fats

Present production of oils and fats, improvements in technology and further development of South American sources should meet our requirements in these trying times, says the author.

By Benjamin Levitt F. A. I. C.

A number of factors have conspired to cause confusion in the oils and fats markets. Reverberations of the war are being felt here in the forms of supply and price. Oils which have been imported for many years, are no longer available. Supply of others is being threatened as the war spreads over further areas. Prices have more than doubled in the past six months. Excise taxes have made prohibitory the use of certain oils, so that the manufacturer has been forced to seek substitutes. Recent developments in oil technology are of great assistance in this emergency. Some uses of oils and fats, together with a brief discussion of present day technology, are presented here.

Our yearly consumption of oils and fats, says the United States Department of Commerce, amounted to over 9 billion pounds in 1937, of which the net imports were two and one half billion pounds. Of this consumption, 40 to 45 per cent is accounted for, by butter and lard.

Tallow is next in order of importance, with a consumption of 884,685,000 pounds of the inedible grade, in 1940, and 46¾ million pounds of the edible grade, used in shortenings, etc. Inedible tallow which constitutes the chief ingredient of soap, represented 45.6 per cent of all the primary oils and fats used in that industry. Imports of tallow since 1936, when the excise tax of 3 cents per pound became effective, fell from approximately 69 million pounds, to under one and one half million pounds last year.

Tallow is the product of rendering beef suet from butchers' trimmings and from abattoirs. The byproduct meat scraps are used for chicken feed and as a fertilizer base.

The fats in power laundry soap, consist wholly of tallow, but in toilet soap, about 75 per cent of the fatty matter is tallow. A goodly portion of edible tallow is separated by refrigeration and hydraulic pressure into oleo oil and stearine. The former is utilized in oleomargarine. The stearine is employed as a thickener and hardener for lard compounds, used as shortenings. Similarly, inedible tallow yields tallow oil, which is used in the manufacture of lubricants, and the stearine finds uses in soap and for the production of stearic acid.

Production of crude cottonseed oil last year, amounted to 1¼ billion pounds, most of which was refined for edible use. This oil is characterized by a considerably higher titer than most other domestic oils. (Titer is the point in degrees centigrade, at which the fatty acids crystallize.) Cottonseed oil is therefore "winterized", which means that the stearine is chilled out. Only the supernatant oil is sold for consumer use.

Cottonseed oil may be "blown", sulfonated and hydrogenated. It can also be vulcanized with sulfur chloride, to produce rubber substitute. The oil as well as the foots is used for soapmaking. Much of the foots is hydrolized by the Twitchell process and distilled, to produce fatty acids and glycerine. Cottonseed meal is cooked and worked up into cattle food or utilized for manuring.

Corn or maize oil, is produced by pressing the germ of the corn. This oil, of which 158 million pounds was produced in 1940, is used chiefly for edible purposes. It can be hydrogenated and thus hardened. The sulfonated product finds use in industrial emulsions for textile, leather manuufacture, and for cutting oils. When treated at high temperature with flowers of sulfur, the resulting product is employed in heat treating of metals. It is vulcanized with sulfur chloride, to produce "factice", a rubber substitute and blender. The oil as well as the foots is used in soap manufacture.

The soy bean has been used for centuries in the Orient, both as a food and for its oil, but since 1908, its value has been realized more and more by western civilization, so that it is cultivated not only for its food value (19% oil, and 30-46% protein), but also for various industrial purposes. Production of the oil has risen steadily from one-quarter billion pounds in 1936, to over one-half billion pounds in 1940.

The oil is used in the manufacture of paint, varnish, linoleum, rubber substitute, core binder, soap and for the production of vegetable lecithin. The protein has formed the basis of a practically new industry, producing plastics, vegetable glue and sock feeds. Considerable soy bean oil is hardened by hydrogenation, for use as a blender with animal and vegetable oils for shortening. In 1938, 80 per cent of the oil went into edible products, 6 per cent into paints and varnish and 4 per cent into soap.

Linseed oil, the most widely used drying oil, is produced by crushing the seed, which yields 32 to 42 per cent of oil. The 1940 production amounted to 606¼ million pounds, nearly all of which was utilized in the manufacture of paints, varnish, oil cloth, linoleum, printing ink and for water proofing. The cold pressed oil is used for edible purposes in some European countries.

Although the domestic harvest in 1939 amounted to 20 million bushels, by far the greatest portion of the oil is produced from imported seeds. About half of the cake and meal is exported.

A small percentage of oil is used in soap manufacture. *Sapo Mollis*, or Green Soap of the U. S. P. is the best known. It consists of 400 grams of linseed oil, 50 cc. glycerin saponified with 19.1 grams caustic potash and 46.3 grams caustic soda which are dissolved in 400 cc. water. The above yields 1000 grams of soap.

Another very useful preparation is Caron oil, used in the treatment of burns. It consists of equal parts of linseed oil and lime water.

Several other drying oils are of importance, namely chinawood oil, of which 97

Factory Consumption of Animal and Vegetable Fats and Oils

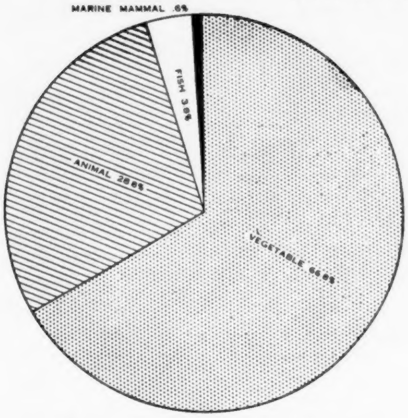


Chart 1. Sources by Types

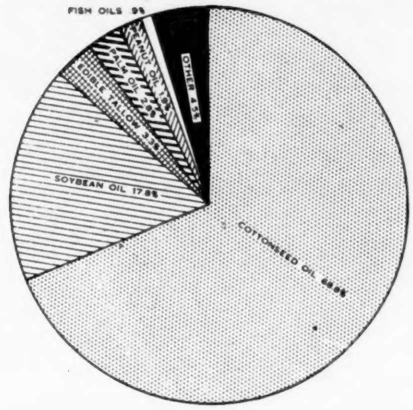


Chart 2. Shortening

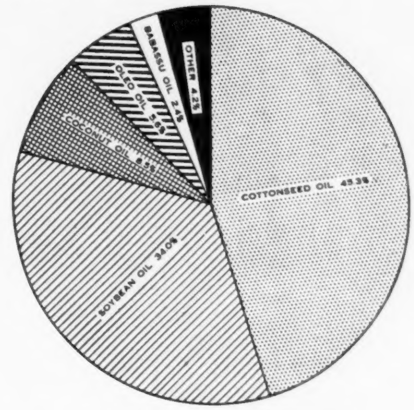


Chart 3. Oleomargarine

million pounds were imported last year. It is valuable to the varnish industry chiefly for its speed in drying and for water resistance.

Perilla oil, another, used in varnish manufacture, produces a hard, brilliant, tough and waterproof film. While imports were 118 million pounds in 1936, they dropped to 11½ million pounds last year.

Oiticica oil, a product of northwestern Brazil, which is the nearest known vegetable counterpart to chinawood or tung oil, was imported to the extent of 18,866,689 pounds in 1939. This oil is valued by the paint industry because it produces paints with greater adhesion, better resistance to atmospheric action, better maintenance of white tones and therefore gives greater surface preservation.

Castor oil is derived from the seeds of the castor plant, the bulk of the supply of which comes from India, China and Brazil. Several of the Latin American countries also export castor seeds. In 1940, 110,059 tons of the beans were consumed to produce almost 100 million pounds of oil. This oil is derived from the decorticated bean by cold pressure. The first pressing is used for medicinal purposes, while the second and third pressings are employed for technical uses. It is refined by steaming, whereby the albumen dissolved therein is coagulated and removed by filtration. The presscake is unsuitable for cattle feed because it contains a poisonous alkaloid, ricine. It, therefore, finds use only for manuring.

Dehydration of castor oil is a new development in oil technology. The reaction is accomplished in several ways, all of which are patented. The idea is to heat the oil with a non-oxidizing acid, with or without a catalyst, until there is a large increase in the iodine value of the oil. There is a molecular rearrangement, during which hydrogen and hydroxyl ions are split off. While castor oil normally belongs to the non-drying class of oils, dehydration results in the production of a good drying oil, which is the best substitute for chinawood oil yet developed. It is sometimes referred to as synthetic tung oil. In some ways it is superior to tung oil, having less tendency to "yellowing" in enamels, it is more elastic and retains its gloss longer than tung oil. However, it is slower in drying and somewhat less resistant to water than tung oil.

When sulfonated, castor oil becomes the turkey red oil, well known to the textile industry. The hydrogenated oil becomes very hard and is used as a substitute for hard waxes. The hydrogenated sulfonated oil, may be used as an ointment base (Amer. Jour. Phar., May 1941).

Castor oil is used also for soaps, linoleum, oilcloth and in the manufacture of sticky fly paper.

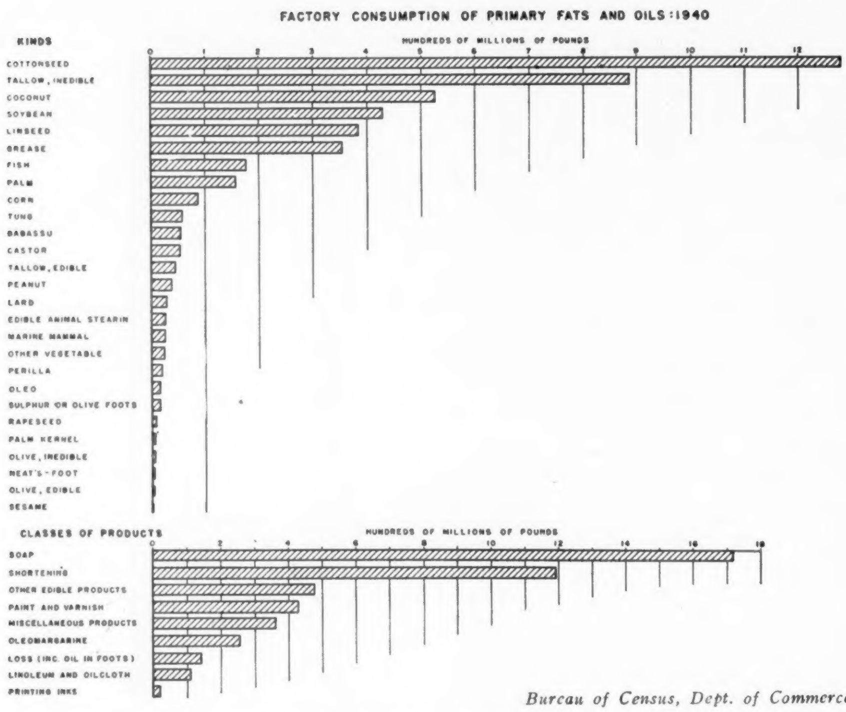
Cocoanut oil is chiefly the product of the Philippines. There are two grades, the Cochin and the Ceylon or Manila which is the lower grade. Much of the oil is now produced in the United States from imported copra (dried cocoanut). Its principal use is in the manufacture of soap. This oil is valuable principally for the profuse lather which it produces when saponified. It constitutes the entire fatty matter in salt water soap. About two thirds of the oil produced in 1938 went into soap manufacture. The balance was used for edible purposes, principally for margarine products, shortening, fancy crackers, candies and for cooking peanuts. In 1940, 275,480 tons of copra were consumed, and 347 million pounds of oil were produced.

The oil is also used in the manufacture of higher alcohols (lauryl), which when sulfonated, have extensive use in the textile, tanning, paper pulp, electroplating and other industries. These alcohols produce the socalled soapless detergents. In 1938, there were 7,668,458 pounds produced in the United States. It has been asserted that sales of products which contain these newer wetting agents total 100 million pounds, as compared with three billion pounds of soap a year.

There are several other oils which are somewhat similar to cocoanut oil, in that they contain a goodly percentage of lauric acid, namely, palm kernel, imported from Africa, East Indies, Mexico and southern Brazil. Cohune nut, found chiefly in British Honduras, Guatemala, Mexico and Panama. During the previous world war, the thick shells of the cohune nut were used in the manufacture of carbon for gas masks. The Babbassu nut found in Brazil, contains 66 per cent of oil. The kernel is surrounded by a hard tough fiber, which is difficult to crack. This has been one of the chief impediments to production of the oil. Imports of the nut and kernels in 1939 amounted to 115,704,431 pounds.

Greater interest should be in evidence in the development of these additional sources of supply, of so necessary a commodity. Trade in these nuts and oils should be developed on the Atlantic Coast as a safety measure, in case any emergency should arise to threaten our supply of copra on the Pacific.

Olive oil has been produced for centuries along the Mediterranean shores. The reason for its great development was first, because the olive is indigenous to the semi-tropical climate there, and secondly, by reason of the religious ban by orientals, on animal fats. The United States



Bureau of Census, Dept. of Commerce

imported 55 million pounds of oil in 1940 and 24½ million pounds of sulfur olive oil.

Besides the use of this oil for edible purposes, considerable quantities are used in the manufacture of textile oils and soap. The U. S. P. *Sapo*, is the official product of olive oil, saponified with caustic soda. This is the true Castile soap. It is used in soap liniment and in making lead plaster.

Sulfonated olive oil is used as a basis for non lathering oil shampoo, very useful for dry scalp. The pure oil is described as nutritive, laxative and emolient.

Sulfur olive oil, or olive oil foots as it is sometimes called, is obtained by extraction of the olive pulp, with carbon bisulfide. It is a viscous, greenish oil with a sulfurous odor, containing over 50 per cent free fatty acids. It is used in the manufacture of soap, for processing silk and wool. The soap is valued chiefly for its easy rinsing in cool or tepid water. In the countries of its origin, the oil is sometimes used as a machinery lubricant. At present, because of price considerations, this oil is being substituted by domestic oils such as red oil and other low titer oils.

The only oil thus far found which closely resembles olive oil, is Chinese teaseed oil. This is an excellent table and salad oil. For industrial purposes it may be interchanged for olive oil in most of its uses. The United States imported 75 per cent of the Chinese production in 1937, but because of the international situation, imports have declined considerably. In 1939 there was only slightly over five million pounds brought in.

Palm oil is used for edible purposes and as an illuminant in its native Africa and East Indies. It produces a hard, slow lathering soap which is favored in wool scouring. In 1938, 45 per cent of the factory consumption was used in shortening and in soap and eight per cent in other work including tin plating. We imported 286 million pounds in 1939.

Rapeseed oil is not used as an edible oil in this country. It is used primarily for lubrication of marine engines and for the manufacture of rubber substitute. It has also been used as a textile oil when obtainable. Relatively high price and shortage of supply have made necessary replacement of this oil with domestic supplies. We imported 65 million pounds in 1936, but last year only 13 million pounds reached our shores.

Sesame oil is used as an edible oil in this country. It is said to resist rancidity longer than many other oils. For this reason, it is used in prepared flours. It is also used to some extent in textile oils. The United States imported 12 million pounds of seeds, and 3½ million pounds of oil in 1939.

Sunflower is grown in the United States, but domestic production of the seed is less than 4000 tons, used chiefly for scratch feed for poultry. This oil because of the excise tax is not being imported at present. It belongs to the semi-drying class.

Supplies of whale and sperm oil have averaged 44,000 tons since 1936. In its hydrogenated form, whale oil loses most of its fishy odor, is white in color and competes with tallow in the soap industry. Some of these oils are hydrogenated to a titer of 80°C. A very considerable tonnage is Twitchelled to produce stearic acid, much used in the rubber industry, and for the production of byproduct glycerin.

Cod oil is used in tanning chamois and other leather. Cod liver oil is imported chiefly for medicinal purposes and for poultry food, as a source of vitamin D. In 1940, over 2 million pounds of cod liver oil was produced, and 15 million pounds imported. There were also 165 million pounds of other fish oils, and 20 million pounds of marine mammal oils produced.

Other fats of importance which were produced in 1940, include the following:

White grease	113	million	pounds
Yellow "	111	"	"
Brown "	80	"	"
Bone "	27	"	"
Garbage "	46½	"	"
Wool "	10	"	"
Other "	17	"	"
Shortening, over one billion			"
Vegetable stearin	71½	million	pounds
Animal edible "	35¾	"	"
" inedible "	21	"	"
Oleo Oil	69½	"	"
Lard Oil	28	"	"
Tallow "	9	"	"
Fatty Acids	123	"	"
" " dist'd.	42	"	"
Red Oil	53	"	"

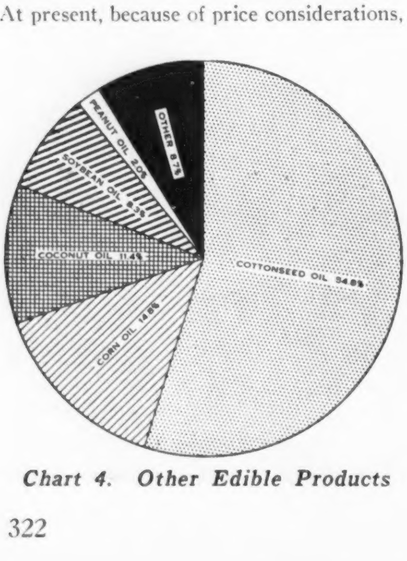


Chart 4. Other Edible Products

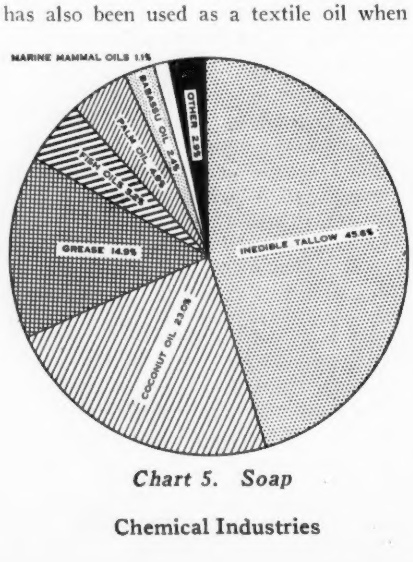


Chart 5. Soap

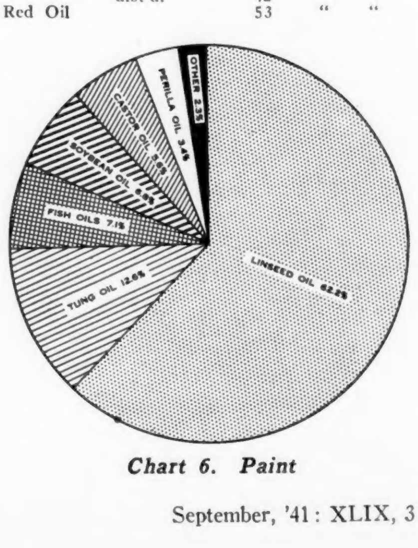


Chart 6. Paint

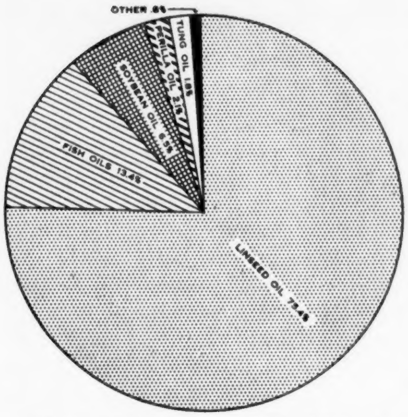


Chart 7. Linoleum and Oilcloth

Stearic Acid	41	million pounds
Cottonseed Foots 50% basis	123	" "
Cottonseed Foots, dist'd	33	" "
Other Vegetable Foots 50% basis	89	" "
Other Veg Foots, dist'd		809,000 "
Hydrogenated Oils	800	million pounds
Acidulated Soap Stock	49	" "
Misc. " "	2	" "

Among the recent technological developments in oils, may be mentioned the extensive recovery of tall oil, or liquid rosin, from slash pine, which is being used for paper manufacture. The United States Dept. of Agriculture points out that the output of this material rose from 13,257 tons in the 1939-40 period, to 18,358 tons in the 1940-41 period. Out of 17 sulfate paper mills in the United States, only six reported recovery of tall oil. It is interesting to note that nearly all the sulfate paper mills in the Scandinavian countries, have been utilizing this source of fatty acids and rosin for many years.

The black liquor is acidulated to recover the liquid rosin, which in its crude form is a blackish viscid oil, with a sulfurous odor. Its composition is as follows: Water 0.5% to 2%, unsaponifiable matter (sterols) 8% to 11%, rosin acids 35% to 45%, fatty acids 45% to 55%. Liquid rosin has a number of uses. It has been used in soaps, metal polish, printing ink, disinfectants, water proofing materials, core binders, in road building, flotation agents and in adhesives.

Fractional distillation of fatty acids and of oils has reached a very high state of development. By this means, fractions may be isolated for special uses. Pure fatty acids ranging from C_7 to C_{17} which include caprylic, capric, lauric, myristic, palmitic and stearic are now available in tank car quantities. Arachidic and behenic acids may be produced from these by hydrogenation. It is predicted that "these developments will open up new vistas of aliphatic chemistry, which will offer unlimited possibilities for application in every chemical field." (See Chemical Industries, Jan. 1941).

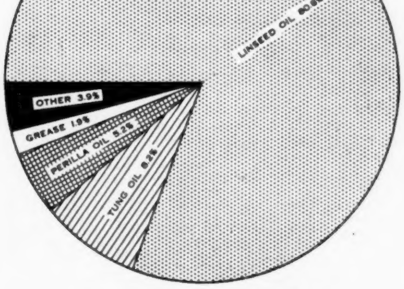


Chart 8. Printing Inks

Oil Seeds Imported for Consumption, Quarter Ending June 30, 1941 and 1940*

KIND	1941 (tons of 2,000 lbs.)	1940 (tons of 2,000 lbs.)	KIND	1941 (tons of 2,000 lbs.)	1940 (tons of 2,000 lbs.)
Castor beans	40,282	26,680	Babassu nuts and kernels	10,015	12,032
Copra	70,486	63,993	Palm nuts and kernels	456	6,977
Flaxseed	93,232	88,312	Other oil seeds	4,855	1,345
Sesame seed	894	2,567			

Fats and Oils Imported for Consumption, Quarter Ending June 30, 1941 and 1940

[The quantities "Entered for warehouse" and not withdrawn during the period are not included]

KIND	1941 (pounds)	1940 (pounds)	KIND	1941 (pounds)	1940 (pounds)
Animal oils and fats, edible	2,128186	337,888	Olive oil, other inedible	192,007	2,335,019
Tallow, inedible	3,287,836	662,577	Tung oil	10,718,000	28,015,210
Wool grease	280,805	879,714	Coconut oil	96,310,924	79,855,906
Whale oil	1,346,970	16,711,418	Palm oil	58,765,331	57,572,223
Cod oil	2,050,260	714,263	Soybean oil	502,150	1,389,641
Cod-liver oil	3,287,205	6,112,815	Sunflower seed oil	......	216
Other fish oil	3,196,972	63,360	Rapeseed (colza) oil	5,124,826	2,697,053
Stearic acid	......	165,194	Linseed oil	44,615	1,087
Grease & oils, n.e.s. (value)	$ 940	$ 1,273	Perilla oil	2,750,832	1,106,475
Cottonseed oil, crude	......	......	Teaseed oil	404,377	296,174
Cottonseed oil, refined	142,191	278,101	Oiticica oil	12,930,914	5,587,863
Corn oil	250,443	192,423	Other vegetable oils	1,489,333	1,413,320
Peanut oil	535,697	1,544,104	Fatty acids, vegetable	250,399	124,438
Palm-kernel oil	......	......	Carnauba wax	7,692,112	4,514,777
Olive oil, edible	3,134,527	23,747,828	Other vegetable wax	3,418,304	2,814,041
Olive oil, sulphured	591,126	9,160,882	Vegetable tallow	875,109	1,103
			Glycerin, crude	1,742,928	1,544,571
			Glycerin, refined	......	1,048

Exports of Foreign Fats and Oils, Quarter Ending June 30, 1941 and 1940

[Includes some oils "withdrawn from bonded warehouses for export" which were not previously included in "imports for consumption."]

KIND	1941 (pounds)	1940 (pounds)	KIND	1941 (pounds)	1940 (pounds)
Fish oil	67,185	52,832	Palm and palm-kernel oil	13,256,721	9,311,973
Other animal oils and fats, inedible	3,563	127,550	Peanut oil	......	387,000
Olive oil, edible	395,082	71,341	Other expressed oils and fats	1,165,841	1,605,368
Tung oil	1,057,059	1,061,882	Vegetable tallow and wax	401,515	951,896
Perilla oil	1,411,040	445,623			
Coconut oil	1,158,827	2,263,024			

Exports of Domestic Fats and Oils, Quarter Ending June 30, 1941 and 1940

KIND	1941 (pounds)	1940 (pounds)	KIND	1941 (pounds)	1940 (pounds)
Oleo oil	108,935	357,542	Cottonseed oil, crude	310,290	385,798
Oleo Stock	27,500	60,769	Cottonseed oil, refined	3,627,953	2,299,647
Tallow, edible	19,967	80,166	Peanut oil	2,087,328	877,039
Tallow, inedible	57,918	175,166	Coconut oil, crude	3,048,543	3,932,684
Lard	53,172,177	46,434,543	Coconut oil, refined	5,014,873	1,784,889
Oleo stearin	2,396	18,718	Corn oil	41,053	97,384
Neat's-foot oil	125,005	151,841	Soybean oil	4,589,273	3,563,264
Other animal oils, inedible	74,044	265,488	Cooking fats other than lard	976,037	939,155
Fish oil	451,629	935,426	Other edible vegetable oils & fats	3,524,067	2,031,950
Grease stearin	57,141	700,599	Linseed oil	1,437,450	1,112,301
Oleic acid or red oil	523,802	359,163	Other expressed oils & fats, inedible	4,337,607	1,635,948
Stearic acid	1,438,463	692,858	Vegetable soap stock	2,465,469	3,482,186
Other animal greases & fats	948,742	742,916			
Glycerin	1,797,211	3,169,662			

* Preliminary Report, Department of Commerce, Bureau of the Census.

Production of fatty acids by catalytic oxidation of natural and synthetic paraffins, has replaced 20 per cent of Germany's requirement of fatty acids for soap making. Last year, about 60,000 tons were produced in that country. There is at least one plant in the United States which is now producing fatty acids by a similar process.

Briefly, the process consists in pretreatment of the paraffin to distil off a product having 19 to 22 carbon atoms, and an average molecular weight of 284. The product is then oxidized at 160°C. with potassium permanganate, manganese stearate, and manganese soaps of the unsaturated fatty acids of fish oils. The products of the reaction may be purified by fractional distillation. (See *Soap*, Aug. 1940, page 28.)

In view of our present production, and the further development of sources from South America which have hardly been tapped, together with the constant improvement in oil technology, we can rest assured that we will be able to meet the requirements during these trying times.

Stocks of Oils and Fats (in 1,000 Pounds)

FACTORY AND WAREHOUSE STOCKS OF OILS AND FATS from reports of the Dept. of Commerce, Bureau of the Census, as of June 30, 1941, compared with stocks Mar. 31, 1941 and stocks June 30, 1940:

OILS:	June 30, 1941	Mar. 31, 1941	June 30, 1940
Cottonseed, crude	52,541	167,195	66,134
Cottonseed, refined	369,589	505,219	553,395
Peanut, virgin and crude	14,650	21,704	7,769
Peanut, refined	39,993	48,513	11,607
Coconut, or copra, crude	176,381	209,490	202,227
Coconut, refined	15,064	15,550	15,467
Corn, crude	15,610	10,549	13,054
Corn, refined	9,164	11,224	12,344
Soybean, crude	34,909	59,133	41,862
Soybean, refined	40,589	29,139	58,323
Olive, edible	7,777	9,395	9,102
Palm-kernel, crude	4,114	2,988	808
Palm-kernel, refined	1,687	1,598	912
Rapeseed	8,133	5,924	4,890
Sesame	688	904	252
Palm, crude	115,134	143,788	131,616
Palm, refined	3,426	5,307	8,933
Babassu, refined and crude	6,373	12,538	9,297
	915,822	1,260,608	1,114,992
FATS:			
Lard	372,176	312,422	309,755
Rendered Pork Fat	11,930	11,980	......
Tallow, edible	9,485	6,079	8,160
	393,591	330,481	317,915
Total Oils and Fats	1,309,413	1,591,089	1,432,907

PRODUCTION AND CONSUMPTION of leading oils for quarter ended June 30, 1941, and for three quarters ended June 30, 1941, covering first nine months of the crop year 1940-41, with comparisons a year ago (Bureau of Census):

PRODUCTION:	Qtr. Ended June 30, 1941	Qtr. Ended June 30, 1940	Three Qtrs. Ended June 30, 1941	Three Qtrs. Ended June 30, 1940
Cottonseed oil, crude	210,932	117,408	1,264,909	1,103,452
Cottonseed oil, refined	304,938	227,907	1,215,042	1,094,808
Soybean oil, crude	141,584	120,623	449,483	431,216
Soybean oil, refined	126,301	99,559	332,684	298,835
Peanut oil, crude	39,768	11,554	165,917	27,588
Peanut oil, refined	38,101	10,912	132,371	20,895
Corn oil, crude	50,246	41,110	131,876	124,706
Corn oil, refined	41,920	38,193	116,081	114,127
Coconut oil, crude	81,054	87,781	255,188	255,748
Coconut oil, refined	90,962	74,379	245,603	218,843
Palm oil, crude	......	......	......	......
Palm oil, refined	22,759	6,919	46,764	25,263
Babassu oil, crude	12,475	18,785	42,122	53,926
Babassu oil, refined	6,378	6,867	14,987	17,326
CONSUMPTION:				
Cottonseed oil, crude	325,732	242,425	1,286,679	1,160,668
Cottonseed oil, refined	402,720	292,308	1,081,962	886,746
Soybean oil, crude	144,709	115,267	383,021	342,179
Soybean oil, refined	104,210	88,792	319,034	264,556
Peanut oil, crude	40,074	11,731	138,605	22,706
Peanut oil, refined	38,901	7,017	78,755	26,124
Corn oil, crude	46,785	41,790	128,726	125,170
Corn oil, refined	15,059	19,874	46,157	57,055
Coconut oil, crude	184,118	151,758	495,933	451,697
Coconut oil, refined	68,904	58,498	182,326	173,520
Palm oil, crude	73,141	35,562	170,973	121,341
Palm oil, refined	25,995	8,624	54,882	44,652
Babassu, crude	16,084	17,917	39,166	50,633
Babassu, refined	5,092	6,501	11,884	15,375

Irving E. Muskat

(*Continued from Page 315*)

ores by chlorination has been studied in great detail. For example, the chlorination of ilmenite ore for the production of titanium tetrachloride and its conversion to pigment titanium dioxide has been developed. Similarly, the chlorination of chromite ore to chromic chloride and the conversion of this chloride to compounds of chromium of commercial interest has been developed. The chlorination of other ores has also been studied.

Under his direction the production of pigments for the rubber, paper and paint industries has been investigated. Considerable emphasis has been placed on the production of finely divided calcium carbonate. Silene—a finely divided calcium silicate pigment—is now being produced on a commercial basis. Production of the once rare chemical, chlorine monoxide, and its conversion to hypochlorous acid and calcium hypochlorite has been carried to full plant production under his guidance.

With these developments in the field of inorganic chemistry, however, the instructor in organic chemistry has forgotten neither academic work nor organic chemistry. Now emerging from the preliminary fundamental work is a new series of synthetic resins, promising ever newer and more fruitful fields. Through a system of post-doctorate fellowships now being established in a number of universities by the Pittsburgh Plate Glass Company under Dr. Muskat's direction, "pure" science is also carrying forward his work. His activity is reflected by a steady stream of patents granted upon his discoveries and inventions, the tempo of his patents being better than one each month.

This month marks the twelfth anniversary of his marriage in 1929 to Dorothy Ruth Gaston (Ph.D. in organic chemistry, Chicago 1930), whom he met in the University laboratories when he came there as a member of the faculty. With their two daughters, Leslie Eloise, 10 and Lindsay Ann, 4, they have lived for the past five years in Akron.

Muskat is a member of American Chemical Society, American Association for Advancement of Science, American Institute of Chemists, Chicago Chemists' Club and Sigma Xi.

← For a review of comparable statistics for earlier years see Statistical and Technical Data Sections: June, 1938, pp. 727-730; July, 1939, pp. 109-112; May, 1940, pp. 653-782.

Chemical Salesmen at Shawnee

Chemical salesmen "out of the doghouse" celebrated the 20th Anniversary of The Salesmen's Association of the American Chemical Industry, Sept. 5-7, at Shawnee on the Delaware. Here's how, below.

Hydrogens licked Oxygens 9-5 in softball game. Shot at left shows beautiful setting with Bill Burke at the bat. Frank Fanning, catching.

Group of golfers watching a long drive down the middle of the fairway (we hope).

Bill Burke of Edward S. Burke and Stephen F. Urban of E. R. Squibb & Sons check up on the golf scores.

A smiling foursome (must've had good scores)—Frank Fanning, N. I. Malmstrom & Co., Charlie Alexander, Seldner & Enequist, Inc., N. I. Malmstrom, N. I. Malmstrom & Co., Bill Growney, National Oil Products.

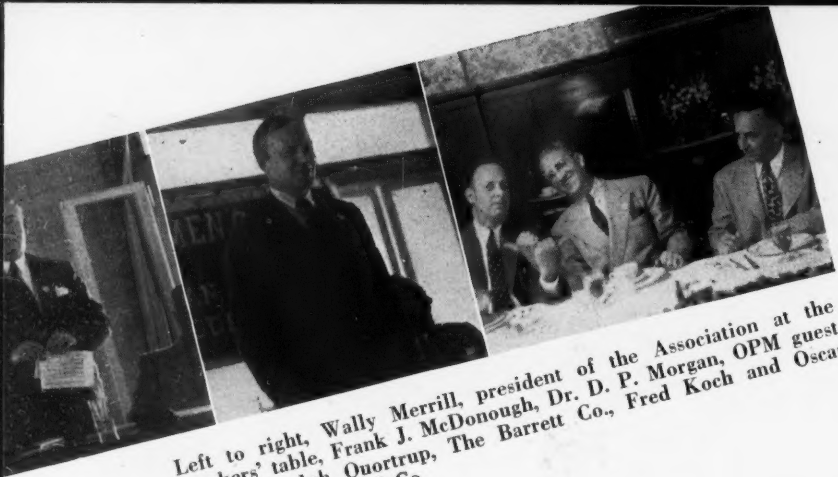
Left, Mike Lemmermeyer, Aromatic Products, Inc., B. T. Bush, B. T. Bush, Inc., and Wayne Dorland of MacNair-Dorland Co., Inc. Corner, E. A. Orem, E. I. du Pont de Nemours & Co., Inc., resting in the shade.

Left to right, speakers' tabl speaker, Ral Lind, Dow C

Above, left to right, Henry F. Hermann, Gen'l. Dyestuff, Paul Dunkel, Dr. D. P. Morgan, OPM guest speaker, Wm. Gibbons, E. A. Orem, Tom Farrell, Bob Quinn and Bob Gould, who is also flanked in the next photo by Ben Spencer and Sam Klein. Gus Bayer and **J. M. Selden.**

Above, left to right, Ira Vandewater, R. W. Greeff & Co., Inc., Le Buehler, The Barrett Co., Ralph E. Dorland, Dow Chemical Co., W Worsted Mills.

Above, left to right, Charles K. Cosse, Kingston Chemical Co., Frank Quinine & Chemical, B. T. Bush, William Adkins, Schimmel & Co., I Phil LoBue, Joseph Turner & Co., George F. Smith, Hugh Craig, OP&D Chemical Co., Cline McKenna, Diamond, Sam Klein, Calco, H. H. Rose Diamond Alkali Co., and Geo. Bode, E. I. du Pont de Nemours & Co.,



Left to right, Wally Merrill, president of the Association at the speakers' table, Frank J. McDonough, Dr. D. P. Morgan, OPM guest speaker, Ralph Quortrup, The Barrett Co., Fred Koch and Oscar Lind, Dow Chemical Co.

Right, Jack Remensnyder, Heyden Chemical Corp., and below him Ira P. McNair and Grant A. Dorland of "Soap."

Cline McKenna, Diamond Alkali and above him Charles V. Douglas also of Diamond Alkali.

er, R. W. Greeff & Co., Inc., Leon Miller and Walter
Dorland, Dow Chemical Co., Wm. Gibbons, Stillwater

Kingston Chemical Co., Frank J. McDonough, N. Y.
am Adkins, Schimmel & Co., R. J. Perry (Zinsser),
ge F. Smith, Hugh Craig, OP&D and Oscar Lind, Dow
l, Sam Klein, Calco, H. H. Rosenthal, Charles Douglas,
I. du Pont de Nemours & Co., Inc.

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Every advertiser in this new EQUIPMENT AND CONTAINER SECTION will have his name, address, and telephone number—a whole line—in bold face type under each of his products.

Because all products will be listed in alphabetical order, for convenience of buyers of equipment and containers, the advertiser can spot his advertisements and get his message across when the buyer is ready to place an order.

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Atlas Mineral Products Co.
Blaw-Knox Company
Buffalo Foundry & Machine Co.
The Philip Carey Co.
Clark Bros. Company, Inc.
Continental Can Company
Crown Can Company
Eastern Can Company
First Machinery Corp.
Fulton Bag Cotton Mills
B. F. Gump Company
The Jeffrey Mfg. Company
Johnson & Johnson
Maurice A. Knight & Co.
Leeds & Northrup Co.
J. C. Miller Company
Mixing Equipment Co.
National Can Company
Pfaltz & Bauer
The Pfaudler Company
Pittsburgh Steel Drum Co.
Proportioneers, Inc.
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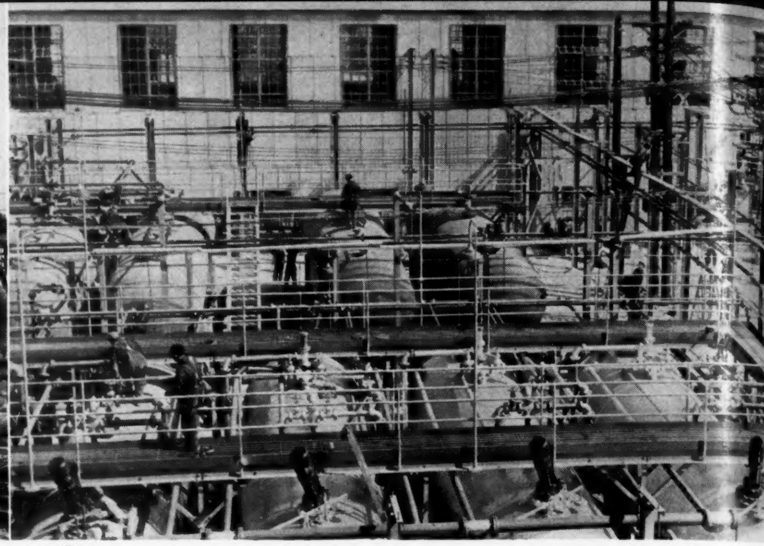

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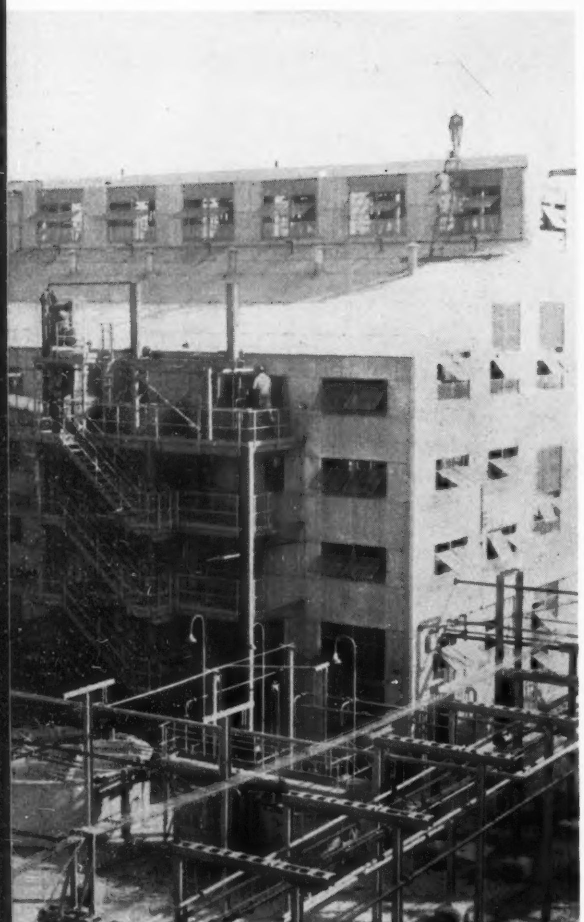

10

Chemical Industry Expands as

THE War Department recently issued a 45-page pictorial brochure showing the accomplishments of a nation in only six months' time in the construction of camps and plants for men and munitions. Entitled "Citadels of Democracy," the booklet has messages from Franklin D. Roosevelt, Henry L. Stimson and (posthumously) George Washington to stress the importance of preparation. In addition to troop housing it gives some idea of the scope and heavy type of construction for production of powder, ammunition, guns, tanks and other vital munitions for national defense. It is a record "of six months of toil and sweat—to triumph over tremendous problems, handicaps, and the forces of nature—in achieving completion of the greatest army building program of all time." CHEMICAL INDUSTRIES chose these photos to show part of what the industry is doing in this vast program.

Photographs 1, 2, 5 and 10 were taken at an Indiana ordnance plant. Smokeless powder plants like this and scores of other munition works already are producing explosives to stock the arsenals of democracy. Photo number 3 shows a Texas ordnance plant "far ahead of schedule."

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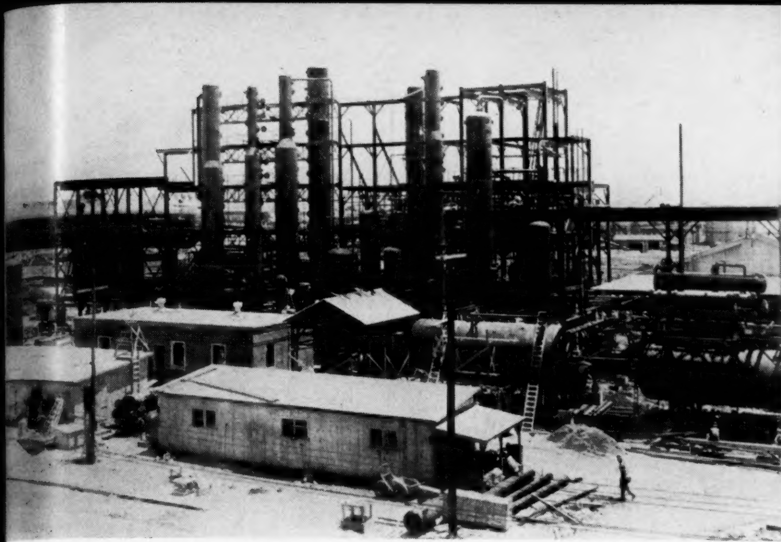

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4

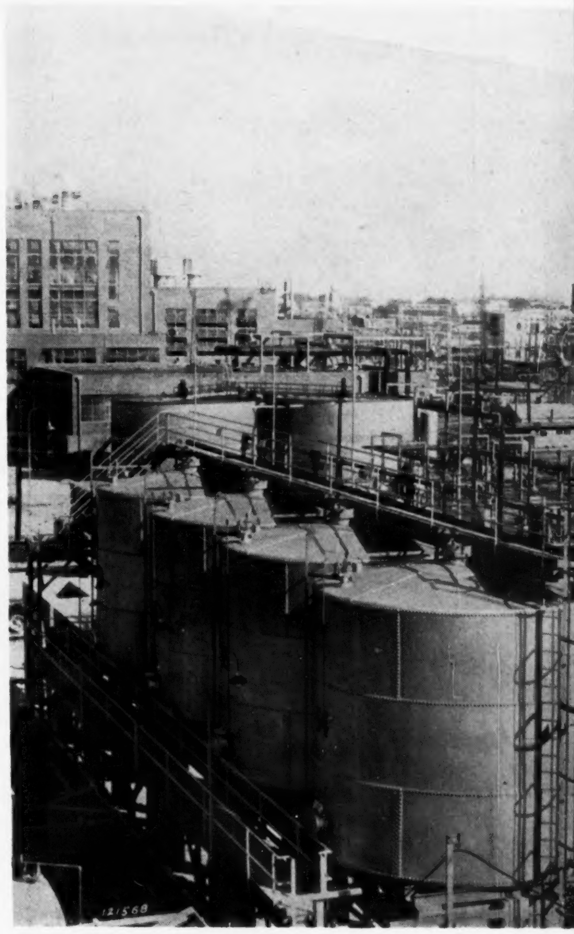
as a "Citadel of Democracy"

Mighty vacuum towers here are rising for the production of chemicals essential in the manufacture of munitions.

Photographs 4, 6, 7 and 8 are of a Massachusetts ordnance plant. Spacious daylight factories and massed machinery like this speed production of arms and ammunition for defense. Photo number 9 shows a Virginia ordnance plant. Millions of pounds of powder for artillery and small arms are now being produced each day in speedily erected new plants such as this throughout the country.

In "A Message to America" in the foreword of the booklet, George Washington's famous words to Congress are quoted, beginning, "If we desire to secure peace, one of the most powerful instruments of our rising prosperity, it must be known that we are at all times ready for war. . . ." Henry L. Stimson, secretary of war, in pointing out the scope of "Citadels of Democracy" and what it has depicted, said, "This epic achievement may well be called a miracle of construction and a demonstration to all America of its latent productive power, brought into action, in a national emergency."

(Photos by U. S. Army Signal Corps)



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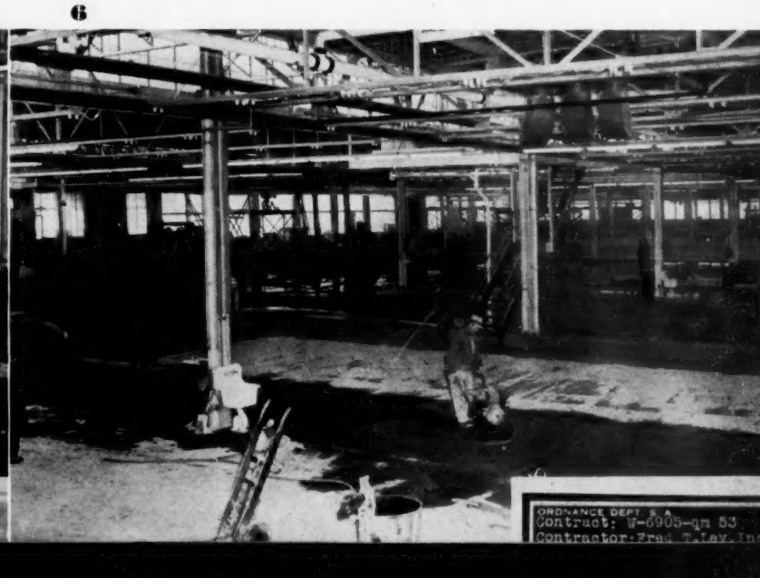

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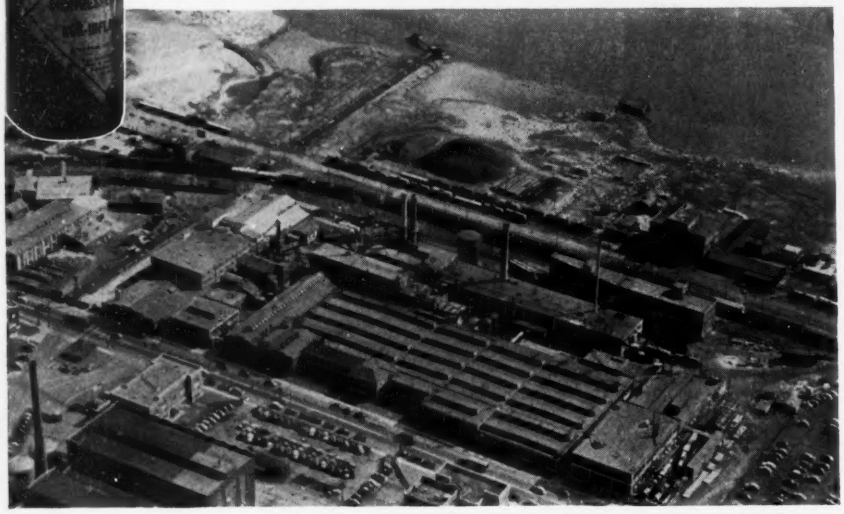
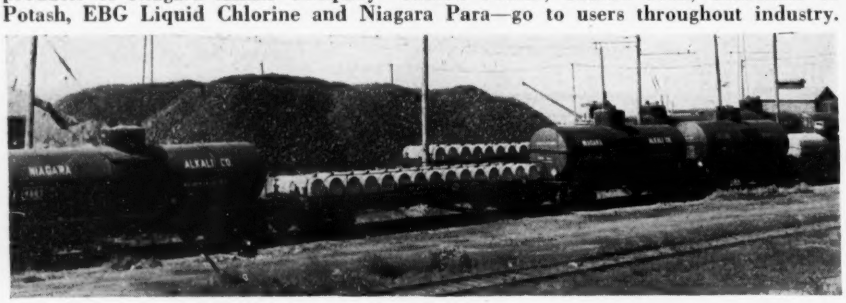
Birthplace of an Industry

From 1 to 4,000,000 Pounds a Day

In 1909, when Electro Bleaching Gas Company produced liquid chlorine for the first time commercially in this country, the initial output was 1 pound. Today the normal consumption of liquid chlorine is 4,000,000 pounds a day. At the left is the original 1-pound cylinder of EBG Liquid Chlorine, and below is the modern plant of the Niagara Alkali Company at Niagara Falls, N. Y., of which EBG is now a part.

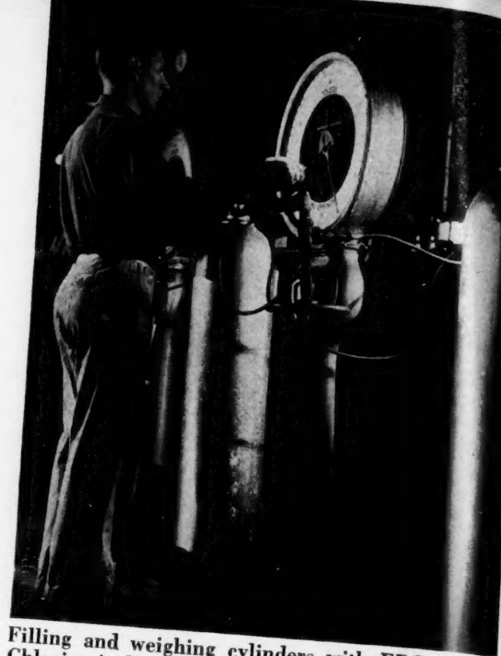


By multiple and single unit tank cars, cylinders, drums and smaller containers, the products of Niagara Alkali Company—Caustic Potash, Caustic Soda, Carbonate of Potash, EBG Liquid Chlorine and Niagara Para—go to users throughout industry.

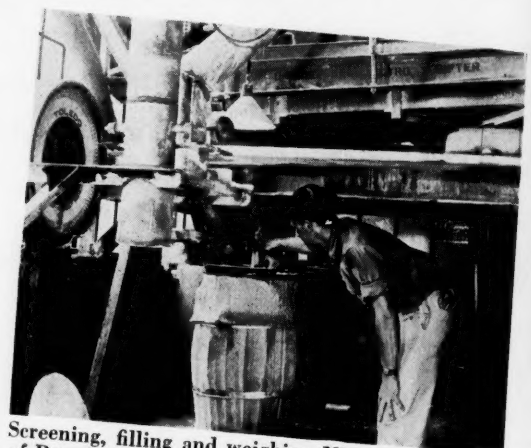


Still growing after more than three decades of service, Niagara Alkali Company has recently completed the construction of a new office building. Modern in every respect, air-conditioned throughout, with acoustic ceilings and fluorescent lighting, supplemented by the liberal use of glass brick, this building is equipped with the most up-to-date facilities and represents another forward step in the history of Niagara.

Looking like the main attraction in a ghost drama, this well-protected worker is filling a drum of flake caustic soda, which is also being weighed as it is filled. Operations of this type are carried out with efficient, accurate equipment at Niagara's plant.



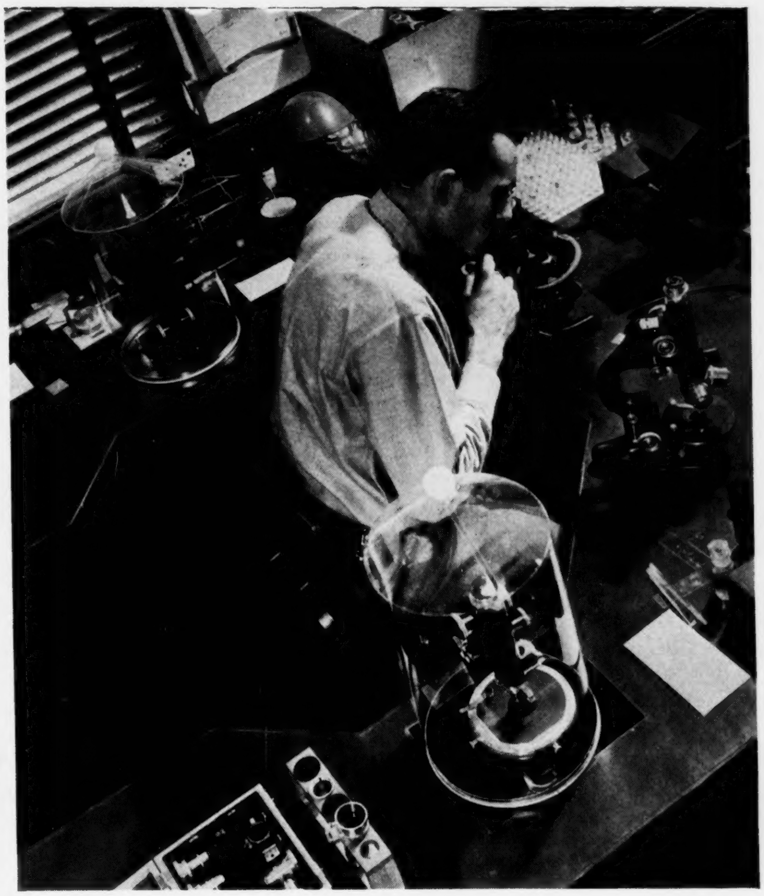
Filling and weighing cylinders with EBG Liquid Chlorine is done with scientific precision. Equally precise and thorough are Niagara's methods of cleaning cylinders, drums and tank cars to protect the purity of its products.



Screening, filling and weighing Niagara Carbonate of Potash.

Fragile are the instruments of research, but substantial are the benefits that accrue to customers of firms that use research properly. Backing Niagara's service to its customers is the company's modern research laboratory, where a large staff of technicians are working constantly to improve Niagara products and adapt them to the increasing needs of industry.

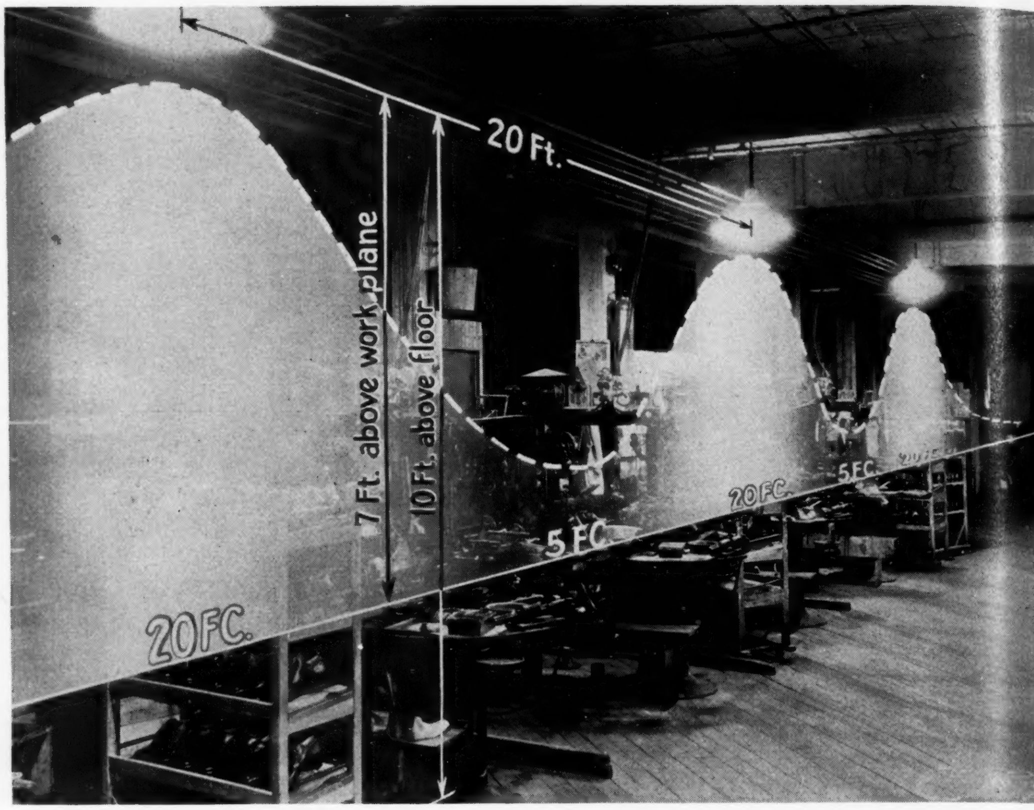
PLANT OPERATION AND MANAGEMENT



The Apparatus of Microanalysis

Westinghouse photo shows use of apparatus designed for handling small quantities of material—by weight sometimes less than a gamma. Some of the apparatus is a diminutive reproduction of the old but radically new equipment is coming out more and more. Here a microanalyst watches color reactions in small fibres through a microscope. Microscopes under glass bells show three-dimensional effects.

A DIGEST OF NEW METHODS AND EQUIPMENT FOR CHEMICAL MAKERS



Roller-coaster lighting is the result when units are spaced too far apart as here in this illustration.

LIGHTING FOR T

By J. P. Ditchman
General Electric Company

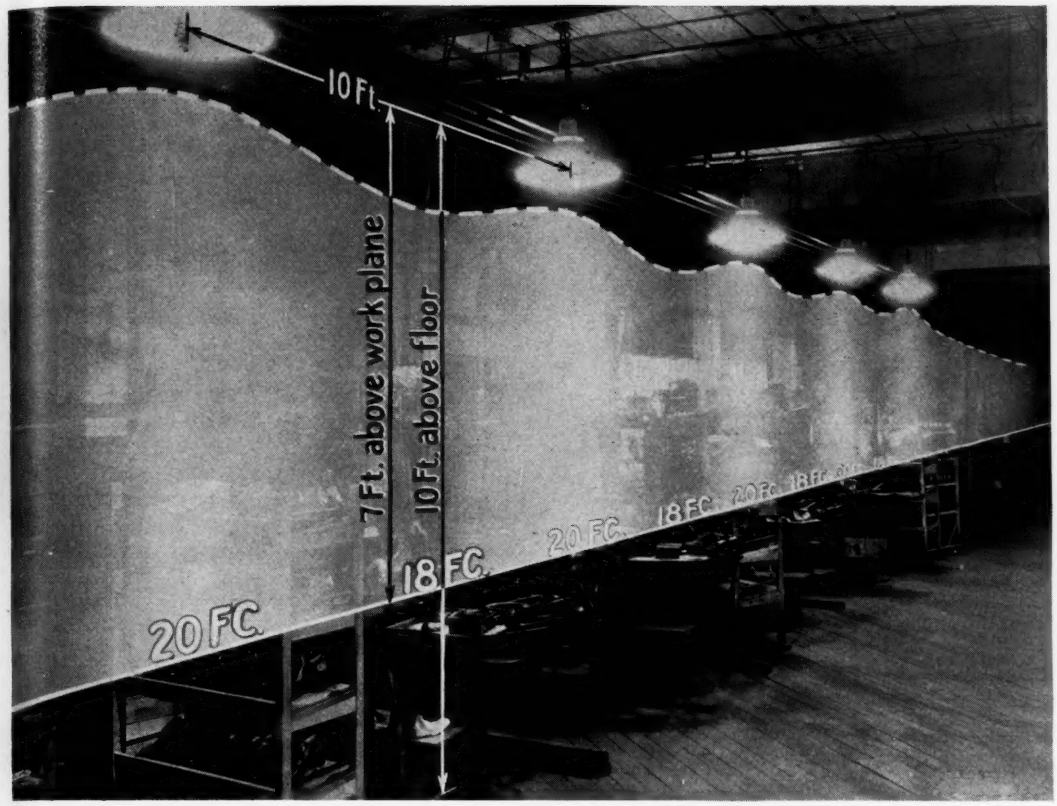
Here is an up-to-the-minute report on what is latest and best in industrial lighting. Chemical plants offer specific problems of lighting. Read about some.

THE chemical plant is one that cannot be readily lighted from a casual examination of floor plans of the building. Every major division of the industry, whether it be the lacquer industry, paint, dye, metallurgical, pharmacidical, rayon, etc., requires a thorough study of the processes involved. This study should be followed by a thorough discussion of the lighting requirements by the chemical engineer, maintenance engineer and the lighting man involved. Because of the diverse operations, therefore, this discussion must of necessity, be a general one.

The first requirement in any industrial plant is a good general lighting system utilizing conventional industrial equipment and which enables the men to move about the plant with safety and ease and make every square foot available for work tasks. To this general lighting system supplementary lighting should be added to all points requiring critical seeing by the operator.

"Recommended Practice of Industrial Lighting" prepared by the Committee on Lighting Practice of the Illumination Engineering Society have published a table, Recommended Minimum Standards of Illumination for Industrial Interiors (these footcandle values represent order of magnitude rather than exact levels of illumination). Footcandle values given in the accompanying table represent standards of various general requirements. They are based on observations of results and actual installations and on the adequacy of present equipment and methods to provide these values with safety and economy. The table does not contain all the operations and recom-

Left, fluorescent lighting is cool, well-diffused and when properly applied makes for quick and sure seeing.



Properly spaced equipment insures uniform lighting. A better environment is your result.

THE CHEMICAL PLANTS

mended footcandles which will be found in any chemical plant, but they can be used as a guide in choosing the light for any particular condition.

There are several general types of lamps that are applicable to the chemical plants. The newest of these sources are the fluorescent MAZDA lamps which produce daylight at the highest efficiency ever achieved in lamp making. With these lamps it is possible to obtain high-level lighting of daylight color quality at a very reasonable cost. Another outstanding feature of the lamp is a great reduction of infra-red radiation with its accompanying radiant heat reduction. This fact deserves emphasis because in the past it has been difficult and costly to provide high levels of lighting of daylight quality without discomfort from heat.. This can be done today because for equal footcandles the fluorescent lamp radiates only about ⅓ as much heat as regular incandescent lamps. Finally, the large-area and low-brightness of the sauce insures comfortable, well-diffused lighting when it is employed with well-engineered equipment.

General Service Mazda Lamps

General lighting service lamps are available in wattage sizes from 15 to 1500. These fulfill the majority of the lamp requirements for factories. A regular incandescent lamp will operate in any position, but the light output maintenance, particularly in lamps of higher wattage sizes is best when they are burned vertically, base up. Most general lighting service lamps may be obtained inside frosted, clear or with white bowls. Clear-bulb lamps are satisfactory for use in adequately shielded reflectors such as high-bay units or diffusing equipment such as Glassteel Diffusers which protect the eyes from the radiating effects and inefficiencies of glare.

White bowl lamps are recommended for use in open type equipments, such as RLM Dome Reflectors to improve the quality of the illumination by reducing direct glare, reflected glare and deep shadows. These should always be operated base up.

Silvered Bowl Mazda Lamps

These are incandescent lamps inside frosted with a brilliant reflecting surface on the bowl which extends from the end of the bulb to the maximum diameter of the bulb, thus shielding the filament from view and serving as an efficient reflector of the light. These may be had in sizes ranging from 60 watts to 500 watts. Special industrial equipment has been designed for them. These lamps should not be used in RLM dome reflectors due to the low output.

Unshaded light sources (as here), should never be employed. The resultant glare reduces ability to see, lowering efficiency of the worker.

Recommended Minimum Standards of Illumination for Industrial Interiors

	Footcandles
Breweries:	
Brew House	5
Boiling, Keg Washing and Filling	10
Bottling	20
Chemical Works:	
Hand Furnaces, Boiling Tanks, Stationary Driers, Stationary and Gravity Crystallizers	5
Mechanical Furnaces, Generators and Stills, Mechanical Driers, Evaporators, Filtration, Mechanical Crystallizers, Bleaching	10
Tanks for Cooking, Extractors, Percolators, Nitrators, Electrolytic Cells	20
Clay Products and Cements:	
Grinding, Filter Presses, Kiln Rooms	5
Molding, Pressing, Cleaning and Trimming	10
Enameling	20
Color and Glazing	20
Glass Works:	
Mix and Furnace Rooms, Pressing and Lehr, Glass Blowing Machines	10
Grinding, Cutting Glass to Size, Silvering	30
*Fine Grinding, Polishing, Beveling, Etching and Decorating	50
*Inspection	100
Paper Box Manufacturing:	
Light	10
Dark	50
Storage	5
Paper Manufacturing:	
Beaters, Grinding, Calendering	10
Finishing, Cutting, Trimming, Paper Making Machines	20
Plating	10
Soap Manufacturing:	
Kettle Houses, Cutting, Soap Chip and Powder	10
Stamping, Wrapping and Packing, Filling and Packing Soap Powder	20
Storage Battery Manufacturing:	
Molding of Grids	20
Silk and Rayon Manufacturing:	
Soaking, Fugitive Tinting, and Conditioning of Setting of Twist	10
Winding, Twisting, Rewinding and Coning, Quilling, Slashing	30
Warping (Silk or Cotton System):	
*On Creel, on Running Ends, on Reel, on Beam, on Warp at Beaming	50
Drawing-in:	
*On Heddles	100
*On Reed	100
Weaving:	
On Heddles and Reeds	10
On Warp Back of Harness	20
On Woven Cloth	30

* Illumination of this order may in some instances be provided from a general lighting system. In other cases it will be found more economical to provide a combination of general lighting plus supplementary. Direction of light, diffusion, eye protection, study of direct and reflected glare, as well as elimination of objectionable shadows are all vitally important and must be considered.

Type H Mercury Lamps

These lamps are available in 250 and 400-watt sizes for general lighting purposes. Other Type H lamps can be obtained for special services. The mercury lamp differs radically in principle from the incandescent lamps, both in their operation and in color quality of the light produced but are applicable to a wide range of industrial installations. These lamps come provided with the conventional screw bases and are adaptable to common types of reflecting equipment.

The operating characteristics of the mercury light source are such that the lamp requires a regulating device for starting and operation. This auxiliary may be located at any point on the circuit so long as no current other than that of its prospective lamp is drawn from it and the voltage drop between the lamps and transformer does not exceed two volts. Several minutes are required for mercury lamps to come up to full brilliance. A recent development in auxiliary equipment is the Tulamp transformer, which is designed to operate two mercury lamps. This auxiliary reduces the transformer losses and the overall cost compared with the single unit.

Mazda Projector and Reflector Lamps

The projector and reflector lamps are adaptable where a high level of accurately controlled light is required over a restricted area from a unit of small dimension. These lamps combine within a single unit all the elements necessary for the production of the controlled light beam. The projector lamp is made of a heat-resisting glass which enables the lamp to withstand a wide range of temperature changes. This glass is also much heavier and stronger than the glass used in the convention MAZDA lamp or reflector lamp, and therefore, will withstand considerable abuse. Since it is impervious to rain and moisture, it can be used outdoors without protection.

Vibration and Rough Service Mazda Lamps

Where lamps are subject to vibration and shock attention should be given to the use of vibration and shock absorbing devices or to the type of system or better location of lighting equipment to avoid these conditions. Where such conditions are inherent, vibration or rough service lamps are recommended.

Vibration lamps regularly are available in the 50-watt size especially designed to withstand high frequency virbation which is produced by high-speed machinery. It is not recommended for horizontal burning or for those operations where shock is inherent.

A rough service lamp is for use where severe shock and bumps occur, such as with extension cords in garages and similar applications. It is available in the 50 and 100-watt sizes with higher wattages for special applications.

Lighting Equipment

Selection of the proper type of reflecting and diffusing equipment is more important today than at any time during the history of illumination. The new light sources of today call for intelligent selection of equipment, not only for efficiency but also for diffusion, direction and control suited to the task. There are several fundamentals of performance usually considered by experienced engineers in the choice of types of units; namely, (1) desirable distribution of light and suitability for particular interior involved, (2) efficiency of light output, (3) inherent maintenance of initial efficiency and ease of periodic cleaning and lamp replacement, (4) adaptability to use of larger lamps should more light be required, (5) sturdiness of construction and (6) cost. The relative importance of each of these factors varies with different applications. For example, in an office elimination of bad shadows would be of first importance, whereas in a foundry the efficiency of producing illumination on the floor and ease of maintenance would rank ahead.

Fixtures may also be rated relatively by applying the following six factors:

1. Direct glare. In industrial interiors it makes seeing more difficult and slows down production.
2. Reflected glare. When excessive, this results in lower visibility, eye-strain, fatigue, loss in efficiency and annoyance.
3. Maintenance. From the standpoint of appearance and economics, it is important that dust collection be kept at a minimum. Units should be easily relamped and cleaned, adequate ventilation must be provided for lamps and auxiliary equipment.
4. Illumination on Horizontal. Of importance from the standpoint of cost of light. This factor takes into account both the output of the unit and the effect of distribution of light in determining the portion of the generated light which reaches the desk or working level.
5. Illumination on the Vertical. In industrial areas it may often be fully as important as the illumination on the horizontal. It also contributes a great deal to the appearance of the room.
6. Appearance of lighted rooms. This refers only to the general or casual effect produced by the entire system and is not a criterion of its value from the standpoint of good seeing or freedom from eye fatigue.

Other factors which may in many instances exert considerable influence on

the selection are eye appeal to fixtures, cost, the adequacy of ventilation and heat radiating surfaces. This latter factor is especially important with certain types of fluorescent fixtures because luminous efficiency and satisfactory performance of auxiliary equipment are dependent upon the operating temperature.

Besides the name and reputation of well-known manufacturers, buyers of fluorescent fixtures are offered the labels of the RLM and Fleur-O-Lier groups as certification of quality and design.

RLM Standard Dome Deflector

This is the standard porcelain-enameled steel reflector which meets many of the general lighting requirements of chemical plants. It is the standardized product of a large number of manufacturers and must meet rigid specifications which insure its mechanical excellence and lighting efficiency. For general purposes, the White-Bowl lamps are recommended for use with these reflectors. When used in dusty or smoky locations, a glass cover plate may be employed to keep the reflecting surface clean.

Glassteel Diffuser

A porcelain-enameled steel reflector fitted with an opal glass diffusing globe which completely encloses the lamp. This globe becomes in effect, the light source and being so much larger in size than the incandescent lamp itself, a much softer, more diffused light is obtained. An installation of these units provides a high quality of illumination without excessive brightness, harsh shadows, direct or reflected glare.

High-Bay Reflectors

These are luminaries having a relatively concentrated distribution of light. They are available in prismatic glass, mirror glass and aluminum.

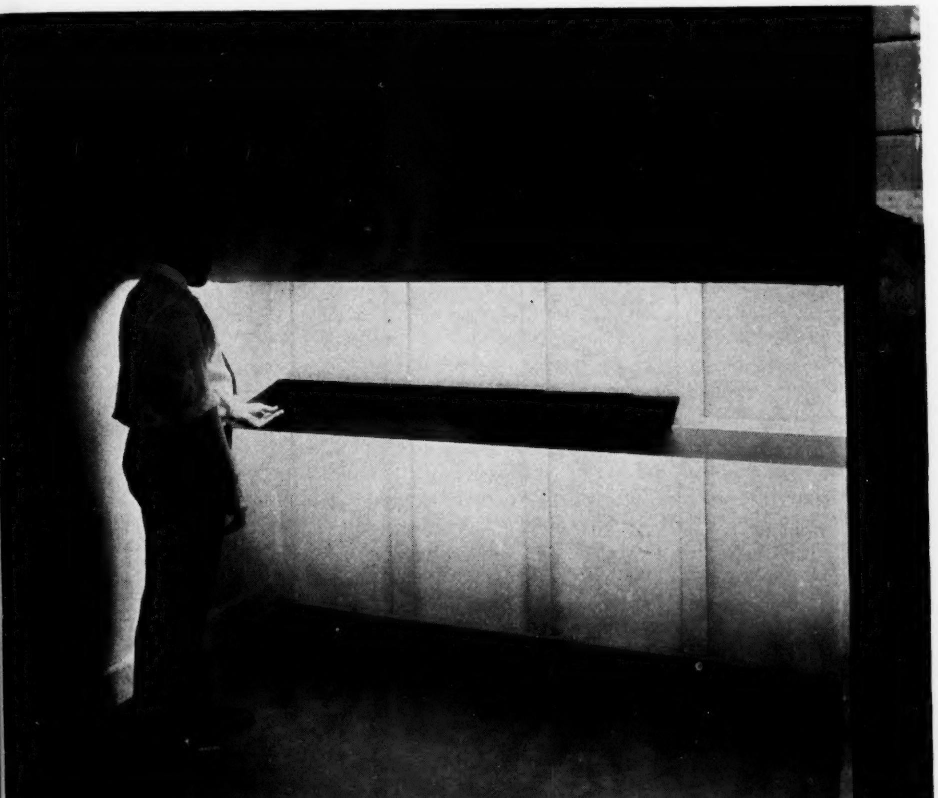
Considerable misunderstanding exists as to where units of this type should be employed. Ceiling height alone is not the governing factor. The more highly concentrating type should be used in bays which are narrow in comparison to their height. With such units sharper shadows, greater reflected glare, and low illumination on the vertical surface must be balanced against the increased efficiency of light directed to the working plane.

Supplementary Lighting Equipment

There are two types of supplementary lighting equipment: (1) small relatively concentrating units which are intended to augment the general lighting over the restricted work areas, and (2) the large-area relatively low brightness sources which may also serve as general lighting systems for restricted areas such as inspection tables, work benches, etc.

There are many types of concentrating units on the market today which, along with the new projector lamps, are applicable for supplementary lighting. In using them it is generally desirable that they be used in equipment properly louvered to eliminate the possibility of direct glare. Units of this type may be attached to the machine, to the ceiling or side-wall or conduit four or five feet from the work. In these locations they are out of the way of the workmen and when aimed properly, are not readily disturbed. Care must be exercised in installing these units so that they will not be exceedingly glaring to one's neighbors.

The large-area diffusing units are usually mounted from three to five feet above the work and consist of large luminous areas which produce a quality of lighting similar to indirect. Some units employ fluorescent lamps with suitable reflecting surfaces to insure reasonably uniform brightness; others consist of luminous elements of white diffusing glass mounted in a box containing lamps, and still others are in effect a matte-white suspended ceiling illuminated by a trough reflector below the ceiling element. Still another type consists of the same suspended ceiling illuminated by the silvered bowl lamp placed below the ceiling. Each of these has distinctive advantages which recommend it for particular purposes.



A specially designed booth for checking color matching of lacquers and baked enamel samples against standards. Thirty-two daylight Mazda F lamps are employed on three circuits providing a footcandle range from 175 to 500.

Vapor-proof and Explosion-proof Equipment

Designed for locations where corrosive vapors and inflammable gases, explosive dusts or moisture-laden atmospheres are likely to be encountered. Such units are highly recommended for processes such as oil refining, paint and varnish making, painting, etc., and in the locations where an ordinary lighting unit might present a hazard.

Color Modification Units

For operations requiring color discrimination it is frequently desirable to provide the color quality of light resembling daylight.

For this service the new daylight fluorescent MAZDA lamp is an excellent source. This lamp has a color temperature of approximately 6500° K, which is the standard for white light established by the National Bureau of Standards. From the standpoint of heat emitted, the fluorescent lamp radiates less heat per watt than the incandescent lamp. This fact is of prime consideration in color work because of the usual close proximity of the source to the workman. Color discrimination and color matching can also be accomplished by filters, which when used with incandescent lamps produce light of any desired color quality. An outstanding installation is shown in the accompanying photograph for check color matching of lacquers and baked enamel samples against standards. The installation consists of 36 daylight fluorescent

MAZDA lamps. The booth is designed to decrease to a minimum the quantity of light reflected specularly to the eye. At the same time it was desirable to keep the brightness contrast between the color samples and the background at a comfortable ratio.

The inspector stands fairly close to the shield which cuts off any direct view of the light source itself. It is possible for him to move his head throughout a considerable area without receiving any specular reflection from the surface of the colored samples. This compensates for the variation in the eye heights of different individuals as well as for the different methods of inspecting samples.

The fluorescent lamps are arranged in three circuits providing 175 to 500 footcandles, depending on the color of samples being matched. The darker samples use the higher illumination. This type of booth is well adapted for similar inspection problems with porcelain enamels, paints, papers and wet or oily surfaces or other materials which exhibited a surface sheen that interferes with visual inspection. It could possibly be adapted to conveyor belt inspection work, the belt replacing the present location of the samples.

Note particularly that the one color temperature source is recommended only for such work as checking production samples against samples of known spectral reflectivity. A more difficult task is that of matching a sample against an unknown standard in which widely different dyes may have been used. In such cases, at least two widely different color temperature sources should be used to check the samples, and the preferred method is spectro photometry.

Many of the industries are so well equipped with automatic machinery that they may require very little man power. However, the multiplicity of gages, dials, instruments that must be watched to insure good products and satisfactory operation of the automatic equipment call for the utmost skill in the lighting of these instruments and their surroundings.

In this type of automatic control the indicator lamp plays an important role. Lamps of all sizes, shapes and voltages are available for this service as well as argon and neon glow lamps. The bake-oven lamp is also available which should be used in all applications where high external temperatures prevail. Many laboratory operations may be carried out in the plant. For this, the illumination should be of such a quantity and quality to resemble the spectrum of daylight so that delicate color changes marking the stages in the addition of acid to liquid solution may be clearly recognized.

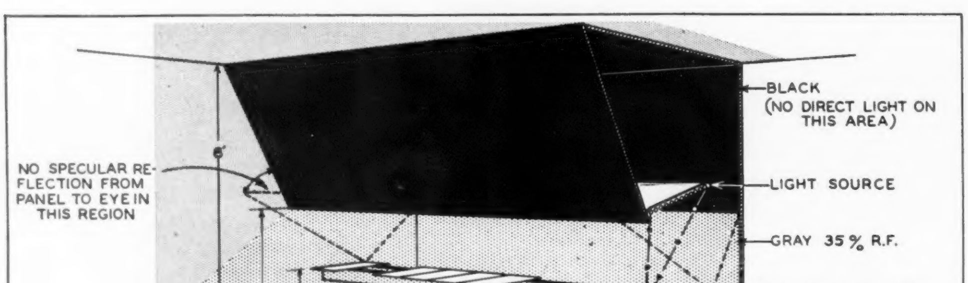
There are many other operations in the chemical plants such as the use of balances, weighing, titrations, noting color changes, matching color samples, etc., that call for all the ingenuity of the lighting engineer. A thorough knowledge of the fundamentals of the Science of Seeing can certainly be applied to good advantage in most of these cases. For instance, the science states that for best visibility, the brightness between the work and the surroundings should not exceed 10 to 1. For example, if the general lighting is 20 footcandles, then 200 footcandles of supplementary lighting could be provided.

Polarized light may be used to minimize reflected glare from surfaces such as glass, linoleum, varnished wood, etc. However, it is only effective when incident light is at polarizing angle and a screen is used at the eye. This type of light is very good to detect strain defects of glass, transparent plastics, etc.

Ultra-violet light sources make it possible to identify products with marks visible only under these units and not seen ordinarily. This same type of light source is also made use of in inspection where it is necessary to determine the presence of fluorescent substances and other materials. The newer small fluorescent units and fluorescent materials can all be used to good advantage in the chemical industry.

Once an installation has been made, good lighting is dependent on one often neglected factor—maintenance. Maintenance consists essentially of replacing lamps, cleaning lamps and reflectors and otherwise keeping the lighting system at peak efficiency. This should be the centralized responsibility of the plant operating department.

The gradual accumulation of dust and dirt upon lamps and reflector surfaces is often unnoticed because usually uniformly deposited dust cannot be seen by contrast between the surfaces. The rate of decrease in light output of equipment varies greatly with the type of work being illuminated; that is, quantity, type of dirt and fumes thrown into the air, as well as the general cleanliness or atmosphere and peak condition of the neighborhood. For this reason, the establishment of a cleaning schedule is not an arbitrary matter but one which is determined by the above factors. The most satisfactory method of establishing a cleaning schedule is to have one of the new, small portable lightmeters in the plant and make a periodic check of illumination. As a general rule, when the lighting drops ⅔ of its initial value, the equipment should be cleaned. In addition to the cleaning of the lighting units, frequent painting and maintenance of the surrounding sidewalls, ceilings and machinery, etc., will help keep the lighting efficiency near the original value. The cleaning of equipment at regular intervals and the repainting of walls and ceilings every few years can be justified from an economic point of view. Environment, however, plays such an important part in the morale and productiveness of the employees that repainting should be done whenever the interior seems dirty and depressing.



This drawing shows the layout of color matching booth on page 337. Note details of booth construction.

New Products and Processes

By James M. Crowe, *Assistant Editor*

THERE are numerous cases where the recovery of the metal indium from old plating solutions, rinse water, etc., is not only possible but economical. The Indium Corp. of America has been doing this for some time. Conditions have developed so that the company has found it advisable to make public a method for this recovery so that others interested can apply it. It has been perfected by J. R. Dyer, Jr., technical director of the corporation.

The metals which may be found in the plating solutions, rinse water, etc., are: Indium, cadmium, lead, tin, copper, zinc, silver, iron, nickel and also some silica. The organic substances present include sodium and potassium cyanide, dextrose, filter paper, etc.

The equipment recommended to carry out the recovery method includes evaporating dishes, plating tanks, ovens, a furnace; dishes, tanks and crucibles made of glass, fused silica, fire clay or perhaps stainless steel, as well as filter presses of the suction or pressure types.

In general the recovery procedure, as developed by Mr. Dyer, is as follows:

A. Water is eliminated by evaporation.

B. Organic materials are destroyed by ignition at temperatures approximately 700 deg., with good draft hoods and plenty of air over ignition surfaces.

C. Silver, silica and some lead are eliminated by solution of the residue after ignition with hydrochloric acid, filtering and washing with pure cold water. Silver chloride, some lead chloride and silica remain on the filter. Remaining impurities and indium are in solution.

D. Copper, cadmium, zinc and nickel are separated from indium, iron and tin by precipitating these metals from solution with excess of ammonium hydroxide. Filter and wash with ammonia water. The filter retains indium, iron and tin hydroxides. The filtrate containing copper, cadmium and zinc in solution is discarded.

E. Indium, iron and tin hydroxides are dissolved in a strong solution of hydrochloric acid and the solution subjected to a plating current of about 7½ volts. The cathode will have all the indium, a possible trace of iron, tin and nickel. The cathode is then made the anode in sulfuric acid electrolyte and the indium again plated out. Tin, nickel and iron will remain in solution. The indium will be of high purity with a possible trace of iron.

Iron is hard to keep out of the recovered indium metal, therefore it is highly desirable to shun it in the waste water solutions as much as possible, says Mr. Dyer. In case the waste water is badly contaminated it may be necessary to resort to precipitation of the indium by chemical transference under "E" by adding "Mossy Zinc" and filtering under acid conditions. The iron remains in solution, the filter will retain the indium and tin together with an excess of zinc. These solids are then dissolved in hydrochloric acid and subjected to the procedure as outlined above.

For the experiments on the recovery of indium from old plating baths, the following procedure, according to Mr. Dyer, is particularly adaptable:

The solutions are first evaporated to dryness and then subjected to a mild ignition, that is, until all the organic matter has burned off. Then the temperature is raised until the cyanide and carbonate salts fuse, and the temperature is maintained until the melt is quiet. The molten melt may then be poured into molds, or allowed to solidify in the crucible. Upon cooling it will be found that the indium has been reduced to metal and will be segregated at the bottom of the mold. The molds are then dissolved in water and the metallic indium, silica, etc., filtered off. These may then be dissolved in hydrochloric acid and subjected to electrolysis for further purification.

The solution should be carefully acidified under a good fume hood and any indium therein recovered by precipitating as indium hydroxide or ammonia. This may then be reclaimed as outlined above.

It is stated that it is possible by this method to recover almost the entire amount of indium, except in such instances where there is a large amount of iron present in the bath. In such cases the recovery is stated to be at least 75 to 80 per cent of the indium.

Auxiliary Material for Synthetic Rubbers

Advance Solvents & Chemical Corporation has recently put on the market an entirely new synthetic auxiliary material for use with synthetic rubbers. The new product is called Advagum. It is a non-tacky, rubber-like solid material, in slab form, has a mild, pleasant, terpene-like odor, and is dark amber in color. It has a specific gravity of 1.1 at 25°C. It is insoluble in petroleum distillates and most vegetable oils.

The acid resistance of Advagum is said to be exceedingly good, especially against hydrochloric and sulfuric acids. It does not char, darken or decompose in contact with such acids. Its compatibility with such synthetic rubbers as neoprene, Hycar, Perbunan and Thiokol, as well as with cellulose nitrate and polysterene, is described as excellent, but it has very poor compatibility with natural rubber.

Advagum is primarily recommended by its supplier for use in the compounding of synthetic rubbers to improve their processing qualities, to increase the tear resistance of the vulcanized products, to decrease the swelling of the compounds by petroleum oils, and to improve the aging characteristics of compounds containing it. Although Advagum itself does not vulcanize, it does remove from useful activity such an amount of vulcanizing ingredients that its presence cannot be ignored in the batch.

No special milling, mixing or vulcanizing procedures are necessary with the auxiliary material. The suppliers simply recommend that the synthetic rubber be given the necessary normal break-down on the mill, then the Advagum should be milled in next before proceeding with working in the other ingredients.

Rust Stain Removal

If unsightly rust stains left on concrete by pipes, steel window frames, iron table or machine legs, buckets, etc., are resistant to ordinary cleaning methods, they will often yield to the following glycerine-containing mixture.

Dissolve 1 part of sodium citrate in 6 parts of water and mix thoroughly with an equal volume of glycerine. Mix a portion of this solution with powdered whiting to form a paste that is just stiff enough to be spread on the stain in a thick coat by means of a putty knife or trowel. This will dry in a few days. After this, it should be replaced with a new layer of the paste or the first layer softened by adding more of the glycerine-containing liquid. Several applications may be required, but the results usually warrant the effort. Quicker results may be gotten by using ammonium citrate, but this substitution may be injurious to polished surfaces.

Improved Insecticides

The effectiveness of insecticides containing pyrethrum, derris and similar poisons is said to be increased by a process patented by Joseph N. Borglin of Wilmington, Del., and assigned to the Hercules Powder Company. The improvement consists of the addition of terpin diacetate, or some other related compound of terpin with a fatty acid. The inventor states that this renders the vegetable poisons more toxic to insects and similar pests. Further advantages claimed are lower cost of production and relative freedom from disagreeable odor.

Wax from Sugar Cane

Out of the sugarcane "mud" that results during the process of milling cane, U. S. Department of Agriculture chemists see the possibility of recovering annually some 6 or 7 million pounds of wax useful in industry and to the householder. Coming at a time when additional domestic sources of such material are especially desirable, due to import difficulties, this process, if put into practical operation will be important to the chemical specialty industry.

The wax occurs as a thin coating on the surface of the cane stalks, according to Howard S. Paine, of the Bureau of Agricultural Chemistry and Engineering, who directed the research on the subject. The coating is so thin, he says, that a ton of cane yields less than two pounds of wax, and recovery would not be economically feasible if it were not concentrated incidentally in the manufacture of sugar. As the juice is crushed from the cane most of the wax is washed off and remains in suspension in the juice until taken out with the "mud" formed

in clarification. This "mud" has always been thrown away as waste although, when dried, it contains from 5 to 17 per cent of crude wax.

The investigators have determined that the best way to get out the wax is to treat the dried "mud" with a solvent and then use a selective solvent to remove fats that have come away with the wax. The result is a hard wax with a melting point of 174°F. Samples sent to the trade indicate there will be a good demand for the product whenever it is produced in quantity. It can be used in the manufacture of polishes, impregnated and coated products, moulded articles, and to replace waxes now difficult to get because of unsettled world conditions.

Organic Intermediates

Commercial availability for the first time of 2,3-hydroxy methoxy benzaldehyde has been announced by the Organic Chemicals Division of Monsanto Chemical Company.

The compound undergoes the usual aldehyde reactions and suggests possible uses as an antioxidant and as an intermediate in chemical synthesis. The material is a yellowish crystalline solid having a crystallizing point of 40.0°C. At 50°C. it has a density of 1.20, which is the equivalent of 10.0 pounds per gallon.

Two other new products announced by Monsanto which are of interest as chemical intermediates are 2,3-dimethoxy benzaldehyde (ortho veratraldehyde), and 2,2'-diamino diphenyl disulfide. These are at present available only in experimental quantities, although the possibility of commercial production is anticipated.

At room temperature 2,3-dimethoxy benzaldehyde is a yellowish brown fused crystalline solid. It has a crystallizing point of 47.5°C. and is almost completely soluble in sodium bisulfide. Specific gravity is 1.117 at 60°C., equivalent to approximately 9.3 pounds per gallon. Its chemical characteristics are similar to those of 2,3-hydroxy methoxy benzaldehyde and it indicates possible use as a perfume fixative as well as intermediate.

2,2'-diamino diphenyl disulfide is a powder of greenish yellow color. It melts between 86°C. and 93°C. and has a molecular weight of 288.

New Pesticides

Highly promising results from the experimental use of dithiocarbamic acid derivatives as pesticides were reported to the American Chemical Society of Atlantic City by Dr. W. H. Tisdale, director, and Dr. A. L. Flenner, chemist at the Pest Control Laboratory of E. I. du Pont de Nemours & Company, Inc.

Tetramethylthiuram disulfide has been found highly effective for repelling the Japanese beetle, they reported, while in more recent field work ferric dimethyl dithiocarbamate was found to be of equal, if not superior value. In addition to its high potency as a fungicide, it adheres to fruit and foliage unusually well without added assistants, it was point out.

"Some of the dithiocarbamic acid derivatives are toxic to mites and highly toxic to the protozoa causing cecal coccidiosis of poultry," according to the two scientists. On the basis of cooperative experiments with ten organic sulfur compounds made by the University of Wisconsin and the Du Pont Company, tetramethylthiuram monosulfide seemed the most satisfactory in protecting chickens against this disease.

Satisfactory results are obtained from the dithiocarbamates in the control of insect pests and fungi, utilizing very low concentrations. None are stomach poisons; many are contact poisons. Contact with Japanese beetles paralyzes their mouth parts and forelegs.

The U. S. Golf Association Greens Section found tetramethylthiuram disulfide most effective of more than 100 chemicals in the control of such turf diseases as "dollar spot" and "brown patch." Four ounces per 1000 square feet resulted in complete control.

Other specific uses for these organic sulfur compounds mentioned by Drs. Tisdale and Flenner included their application in combating apple scab, cedar rust diseases of apples and related plants, rose mildew, and black spot of roses, cherry leaf spot and brown rot of fruit stones. Considerable promise may be held, it was said, for the use of dithiocarbamic acid derivatives as seed and soil disinfectants.

Novel Hydrocarbon Insecticides

An interesting departure from the ordinary type of insecticide is announced by the Velsicol Corporation, Chicago, Illinois, manufacturers of specialty petroleum products.

According to Mr. A. R. Jameson, Vice President in Charge of Sales of the Velsicol Corporation, the new insecticides —known as AR-50 and AR-60—are 100% hydrocarbon oils of petroleum origin. Extensive entomological experimentation has demonstrated these oils—used either undiluted or in admixture with common insecticidal materials—to possess unusually high toxicity toward houseflies and other insect pests. The oils appear to be nontoxic to warm-blooded animals. When tested in the Peet-Grady chamber, both AR-50 and AR-60 gave kill values ranging between 90 and 100%, along with very rapid knock-down rates for houseflies. Furthermore, repellency determinations demonstrate the oils to possess repellent qualities to a remarkable degree. Even the vapors of these petroleum compounds are highly toxic toward insects. The new Velsicol hydrocarbon oils appear also to act as very efficient ovicides.

Velsicol AR-50 and AR-60 differ from one another principally in volatility, the latter product being the less volatile. The Velsicol Corporation is recommending AR-50 for use as an indoor pest control agent, while AR-60 is recommended for use in cattle sprays. Highly efficient and relatively inexpensive formulations have been prepared by the Velsicol Corporation in which their new insecticides are used in conjunction with various well-known synthetic and natural agents. These formulas, along with samples and technical data, are available to pest control operators and insecticide manufacturers upon application.

Extensive experiments on the use of Velsicol AR-50 and AR-60 are now in progress in the control of termites and agricultural insect pests.

New Type Neoprene

A new type of neoprene synthetic rubber that withstands the effects of sub-zero temperatures better than other types of neoprene is announced by the Du Pont Company.

This new product, called Neoprene Type FR, was announced to the American Chemical Society by D. F. Fraser and F. L. Yerzley of the Du Pont Company in a paper presented at the Atlantic City meetings of the Society on September 12. It combines the desirable qualities of natural rubber at low temperatures and the oil-resistant qualities characteristic of all types of neoprene. Up to the present all known types of synthetic rubber have been deficient with respect to their ability to withstand the effects of extreme sub-zero temperatures. They invariably hardened when exposed to these extremely low temperatures. Neoprene Type FR, howver, is as freeze resistant as natural rubber, and at the same time oil resistant.

In addition, the vulcanizates of Neoprene Type FR are more resilient, take lower compression set, and have greater resistance to swelling by water than those of other neoprenes. In fact in these properties it equals or even exceeds rubber itself. Like rubber, Neoprene Type FR requires sulfur to obtain an adequate state of cure in normal vulcanizing operations. Like other types of neoprene, Type FR has excellent flame and sunlight resistance. It is supplied in the form of preplasticized, milled sheets and has a lower specific gravity than any other neoprene—1.15.

Immunity to the effects of extreme cold is becoming of increasing importance in many applications of rubber-like materials. However, the physical changes that take place in rubber-like materials at low temperatures are not clearly understood and extensive studies of testing methods and compounding are being continued by the Du Pont Company in order to enlarge the knowledge of these phenomena and to improve compounding procedure.

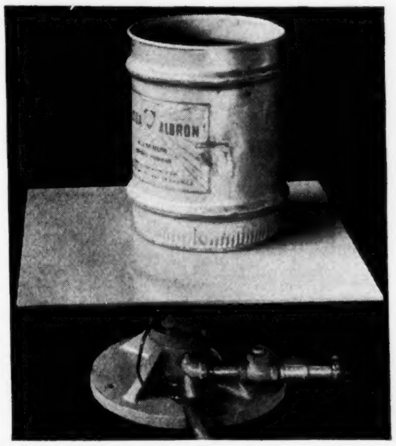
NEW EQUIPMENT

Hydraulic Jolters QC 131

A new line of water-powered hydraulic jolters or packers is being placed on the market by the Syntron Company, 420 Lexington Avenue, Homer City, Pa.

These new jolters have been designed for effecting a dense compaction or settlement of materials in barrels, drums, etc., particularly of light, fine, powdery materials that have heretofore been most difficult to pack.

The jolter is made up of a deck plate on which the barrel, drum, carton or other container to be filled and packed, is placed and a hydraulically operated cylinder lifts the table and drops it with a sharp jolt approximately once per second. The speed of the jolts per minute as well as the overall lift are controllable by a hand valve in the water line.



Surprisingly little water is required for operation at water pressure about 50 lbs. per sq. in., and where lower pressures only are available, a small electric motor driven pump with a closed circuit can be supplied to operate the equipment.

Horizontal—Vertical Filter QC 132

The Seitz Flexmaster (patents pending) is an entirely new type of filter, according to the American Seitz Filter Corporation, of Paterson, N. J. It combines sheet and alluvial filtration, combines any kind of media, in a filter that turns from horizontal to vertical operating position.

Chief advantage of this new arrangement is said to be prevention of collapse of the filtering layers, however short the run, since these layers top each other during operation, so that they are held intact both by gravity and the pressure of the unfiltered liquid.

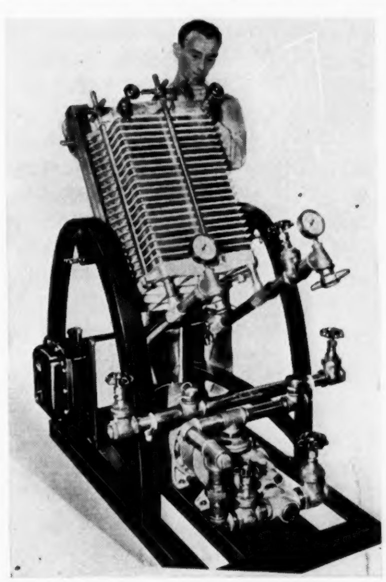
Another feature is that the filter can be drained dry by a quick shot of compressed air to completely recover the residue—and this is accomplished, even though every inch of filtering surface is used during the entire run.

Direct dual filtration can be used when required. The unfiltered liquid flows directly through two joined filtering media, such as diatomaceous earth deposited on a filter sheet. Rough and polish filtration are thus combined, with an unlimited choice of media.

The Seitz Flexmaster is balanced on an axis, swings easily, and locks in either horizontal or vertical position. Loading of the filter is started in horizontal—plates are slid apart—sheet, filter paper, cloth, etc., are slipped and aligned over two sleeves that connect the discharge channels of the plates—and the entire unit is fastened.

The filter is then swiveled into a vertical position. Feed and discharge lines are connected with two special unions. Setting now begins by using a pump and mixing tank and recirculating the filter aid, such as diatomaceous earth, asbestos, etc., until the precoat is deposited on the back-up sheet, paper, cloth or screen.

Seitz Flexmaster has two head plates, one movable, the other fixed. Each is a filtering surface. In between come the double-acting plates. When in horizontal, the top of the plate acts as a discharge chamber, and the bottom acts as a feed chamber with the media between. They are screened on one side. Two feed channels and two discharge channels run inside of the plates. The filtering material has four holes to correspond with these channels. No washers are necessary. The sleeves, connecting the discharge channels, serve as supporting rods for the sheets and prevent washing away of filtering fibers around the channel edges. Because plate-surfaces are so accurately machined and ample sealing pressure can be applied, no dripping should occur even when filter paper is used.



For the cleaning operation the filter is tilted back to horizontal, the plates parted, and the spent layers are stripped into the drip pan which is supplied with the filter. It is not necessary to lift each plate out separately.

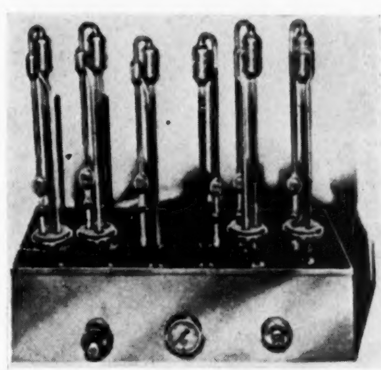
The Seitz Flexmaster can be constructed of any material for specific operating requirements—tinned bronze, iron, stainless steel, monel, nickel, etc. Stand and base are cast iron or welded steel.

The Flexmaster plates are 16″ and 24″ square. Maximum number is 20. Standard plates hold ½″ thick filter layers, but special plates can be had for 1″, 1½″ and 2″ filter layers. Flowrates depend of course on varying factors.

Cleaning and Drying Apparatus QC 133

This cleaning and drying apparatus primarily was designed for glass viscosimeters for determining kinematic viscosity by C. J. Tagliabue Mfg. Co. However this equipment is also adaptable for use in connection with the cleaning of other types of glassware such as test tubes, pipettes, etc.

The tubes are placed over and supported by vertically extended metal capillary tubes through which the cleaning fluid is sprayed.



Drying is accomplished by passing air under pressure through the tubes. Pressure is regulated by means of special valves and the amount of pressure may be closely controlled and observed. Provision is made for first connecting the spray line to the vessel containing the cleaning liquid. Then by adjusting the valves, air is forced through the tubes. To prevent excessive use of solvent or cleaning fluid, a spring valve is used which closes when the valve handle is released.

This instrument is now used in some of the large oil refinery laboratories and is said to have many advantages.

pH Control QC 134

With more and more paper mills forming sheet at higher pH values, the problem of adding reagent at just the needed rate is becoming more important and more difficult. It's becoming more important, because small variations in pulp, in beater furnish, in showers, or in chemicals—variations which mean little when pH is low—become important to the quality of finished paper, when pH is high.

It's becoming more difficult, because at higher pH values, the stock is more critically affected by variations in the addition of the reagent. If these higher pH values are to be maintained uniformly, the addition of reagent must be more precise.

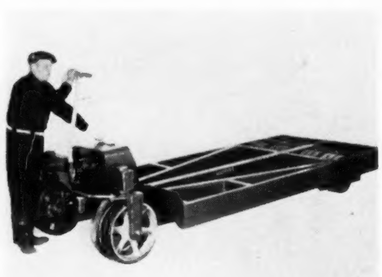
The Leeds & Northrup Company reports that through the use of automatic equipment which controls the pH of paper stock by regulating the addition of alum (or other reagent), a number of mills are turning out finished paper which is said to have remarkable uniformity, retention and permanency. Frequently, too, there's a reported decrease in the consumption of alum . . . and a lengthening of wire life, due to less corrosion.

The equipment is simple. An unusually rugged electrode assembly continuously detects the pH of stock (or of white water) . . . and a Micromax recording controller continually measures, indicates and records it. Should pH begin to depart from control value, the Micromax controller, acting through an M. E. C. control unit and a powerful drive mechanism, instantly begins to readjust the reagent feed valve. This control action is of the proportioning type . . . that is, a small pH deviation causes a small readjustment of the valve, while a larger pH deviation results in a correspondingly larger valve movement. This proportioning action is said to result in smooth, steady control and no overshooting.

The electrodes are sealed at the factory and thus require no mixing of chemicals and no adjustments. These, and all other parts of the apparatus, according to the makers, are sturdily built, fully accessible for routine checks and servicing, which any ordinary mill maintenance man can perform.

Hydraulic Lift Truck QC 135

Lewis-Shepard Sales Corporation is currently releasing information on its extra-large hydraulic hand-lift trucks for handling large machine tools. These trucks can be furnished with capacities up to 35,000 pounds.



The truck shown in the photograph is 35,000 pounds capacity, with a platform length of 10′ and a width of 5′. The lowered height of the platform is 15″. This truck has four rear wheels, 15″ in diameter by 10″ face. The rear wheels are mounted on heavy-duty roller bearings. There are four front wheels, 20″ in diameter by 5″ face, mounted in an auto-type steer on heavy-duty roller bearings, and the truck is equipped with a towing hook at the front. The rugged heavy-duty hydraulic lifting mechanism is enclosed to protect it against dust and dirt. The lowering of this truck is controlled by a variable speed dead-man-type control lever to assure shockless lowering, offering maximum protection to the load. With this type of control, the load can be locked at any height.

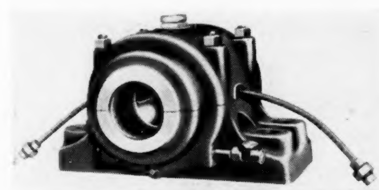
New Bearings QC 136

These new Sleevoil precision pillow blocks in plain and water cooled types in shaft sizes from $1\frac{7}{16}$-inch to 8-inch inclusive were designed by Dodge Manufacturing Corp. for a wide range of industrial applications where a high grade babbitted bearing is required.

Ample lubrication is provided by the use of "T" section brass oiling rings. Single rings are furnished in sizes up to $3\frac{7}{16}$-inch inclusive and two rings are used in larger sizes. A brass oil gauge is provided which can be placed on either side of the bearing and by the use of additional $\frac{1}{2}$-inch pipe can be extended to any distance from the bearing. Bases have drain holes in each end and caps are provided with inspection hole and cover.

These bearing are self-aligning and can be furnished in either expansion or non-expansion types. Expansion pillow blocks have no provision for thrust loads but the non-expansion bearings are supplied with two internal split thrust collars. This type should be used as an anchor bearing and other bearings on the same shaft should be of the expansion type.

Effective sealing against admission of dirt or escape of lubricant is provided by special seals held onto the shaft by garter springs so that they revolve with the shaft and give the effect of piston ring seals. A drain is provided at the bottom of the seal grooves to carry oil back to the oil chamber.



Sleevoil water cooled pillow blocks are identical in design and construction with the plain type except for the water cooled feature which makes them particularly adaptable for service where elevated temperatures, heavy loads or rubbing speeds are encountered.

Sizes up to and including $3\frac{15}{16}$-inch are water cooled in the lower liner only and have one flexible inlet and one outlet connection. Sizes $4\frac{7}{16}$-inch and larger are water cooled in both upper and lower liners and have two flexible inlet and two outlet connections.

Portable Generator QC 137

The Kato Engineering Company, Mankato, Minn., has added a new, compact, light weight, portable unit to their line of light and power plants, namely, the Model 23A which generates 500 watts standard 110-volt, 60-cycle, A. C. or 200 watts at 6-volts D. C. suitable for battery charging if desired.

Because of its portability, compactness and rugged construction, it is suitable for operating lights, radio and small appliances, or any other application where 500 watts capacity is all that is desired. Comes complete with Johnson 1 h. p. "Iron Horse" single cylinder, aircooled, four cycle, engine, $2\frac{1}{4}$″ bore; $1\frac{3}{4}$″ stroke; A. C. generator; push button starter; carrying handle; aircleaner; rope crank pulley; charge control resistor; D.C. ammeter; cutout; battery cables; filtered and shielded for radio operation.

Chemical Industries
522 Fifth Ave., N. Y. City.

I would like to receive more detailed information on the following equipment: (Kindly check those desired.)

QC 131	QC 133	QC 135
QC 132	QC 134	QC 136
	QC 137	

Name ....

Title .... **Company** ....

Address ....

HydroFluoric acid

HF HF HF HF HF HF

available in six strengths for ETCHING, CLEANING, BLEACHING

For etching and frosting electric light bulbs and other glass products, for pickling stainless steels and other metals, for bleaching straw and many other industrial purposes, it pays to specify hydrofluoric acid made by Pennsylvania Salt.

Made to meet your most exacting requirements, this hydrofluoric acid is available in five strengths for domestic users — 30%, 48%, 52%, 60% and 80%. For export, there is 71-75% acid. Shipment is in 13 gallon rubber drums for strengths up to and including 52%. 71% to 80% are packed in 20 and 55 gallon steel containers. 60% is packed both in rubber and steel containers.

Our representatives will be glad to advise you about profitable applications of hydrofluoric acid and other Penn Salt products in your plant. For full information, write to Pennsylvania Salt Manufacturing Co., Widener Bldg., Philadelphia, Pa.—New York • Chicago • St. Louis • Pittsburgh • Wyandotte • Tacoma.

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Principal Penn Salt Products

Alum	Kryocide
Alumina	Mixed acid
Aluminum sulphate	Nitric acid
Ammonia, anhydrous and aqua	Orthosil
Ammonium persulphate	Penchlor Acid-proof Cement
Asplit Cement	Pennpaint
Bleaching powder	Pennsalt Cleaners
Carbon bisulphide	Pensal
Carbon tetrachloride	Perchloron
Causplit Cement	Sal ammoniac
Caustic Soda	Salt
Chlorine, liquid	Salt cake
Copperas	Soda ash
Ferric chloride	Sodium aluminate
Hydrochloric acid	Sodium bicarbonate
Hydrofluoric acid	Sodium hypochlorite
Hydrogen peroxide	Sulphuric acid
Kryolith	Superphosphate

PENNSYLVANIA SALT
MANUFACTURING COMPANY
Chemicals

PROTECTION
WHEN MOST NEEDED!

• SWEEPING COMPOUNDS are "tricky" to handle, at least they were, until Chase engineering devised a special bag . . . an economical container that resists deterioration and breakage . . . and the penetration of oils in the compound.

• Chase engineers laminate a special greaseproof crinkled Kraft to a durable fabric and give it a flexible coating to provide a bag that answers the requirements satisfactorily and economically. For sweeping compounds with moderate oil content, the bottom and center seams are sewn; for those having more oil, cemented.

• If you have a product that requires special packing, let Chase provide the protection you need. Call any one of 27 offices or write us!

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COAST-TO-COAST SERVICE

Shipping and Container FORUM

By RWLahey

ICC CHANGES REGULATIONS ON TRANSPORTATION OF DANGEROUS ARTICLES—NEW SAFETY REGULATIONS FOR TRUCKING—STEEL DRUM STATISTICS—NEW FUEL DRUM AND CARBOY POURER—BRACING OF CARLOAD SHIPMENTS OF OIL PRODUCTS

THE ICC has issued proposed changes and additions to the Regulations for the Transportation of Dangerous Articles. The Bureau of Explosives will be prepared to confer with interested parties at the ICC offices in Washington, D. C., at 10 o'clock A.M. (Eastern Standard Time) on Sept. 15, 16, and 17. The formal hearing will also be held at the ICC offices in Washington at the same time on Sept. 18.

The changes of most interest are as follows:

(1). Section 181—specifies that *export shipments* by water must be packed, marked, labelled and described in accordance with the ICC Regulations.

(2). Section 183 *Guanadine Nitrate* has been added to the list of nitrates which are exempt from the Regulations when packed as prescribed. *Glass Bottles* containing not *over 25 lbs.* of nitrates are also exempt when packed in fiber boxes.

(3). Sections 246 to 272—Provides for export shipments of many *corrosive liquids* in *single trip boxed carboys of 5 to 6 gallons capacity.* Among the corrosives so authorized are acetyl chloride, acid sludge, hydrobromic acid, hydrochloric acid, hydrofluorosilic acid, hydrogen peroxide, mixed acid, nitric acid, perchloric acid, sulfuric acid, alkaline corrosives, etc.

(4). Section 303 authorizes shipments of certain *compressed gases* in *ICC 106A 500 tank cars* and such tanks may be transported *on motor trucks.* These gases are monochlorodifluoromethane, monochlorotetrafluoroethane, and methyl chloride.

(5). Section 339 (b) provides for *small unit shipments of analine oil* in specification wooden boxes in inside glass containers of not over 1 lb. capacity each and not more than 25 bottles to the outside box.

(6). Section 354 (c) *Arsenical compounds* containing *10.0 per cent or less* of arsenic trioxide (As_2O_3) may be shipped in *triplex bags ICC 36A or 36B.* Shipment in these bags has been limited to arsenical compounds containing less than 8% arsenic trioxide.

(7). Section 354 (d) Cancel the ICC44B *multiwall paper bags* authorized for packing *arsenical compounds.* Some shippers have objected to this container as they consider it unsafe.

(8). Section 357 (a) (b) *Calcium Cyanide* packed in *ICC37H metal drums* must be hermetically sealed *but the soldering provision has been eliminated.* Scarcity of galvanized drums have compelled use of black steel drums which cannot be soldered.

(9). Section 357 (a) *White sodium cyanide* of globular or pellet form (dia. not less than ¾") *may be shipped* in not over *100 lb. cloth and paper lined bags,* ICC45B.

(10). Section 364A provides containers for *small quantities* of *monochloracetone.* Glass bottles containing not more than 1 lb. or tubes packed in hermetically sealed metal cans in corrugated fiber boxes. These containers are to be packed in ICC specification wooden boxes, not more than 24 lbs. of liquid in an outside box.

(11). *Shipping container Spec. IX.*—This new carboy specification is for the single trip carboy of 5 to 6 gals. capacity referred to in No. 3 above.

(12) *Shipping Container Spec. 45B.* this new bag specification has been added for shipments of white sodium cyanide referred to in No. 9 above. This new bag consists of 2 plies of poly vinly alcohol or cellophane combined with 8 oz. burlap or 8½ oz. osnaburg and paper laminated together with latex and/or asphalt.

Revision of Motor Truck Safety Regulations

The Interstate Commerce Commission have proposed a revised set of safety regulations for the transportation of dangerous articles by motor truck. These regulations are to apply to common and contract motor carriers engaged in interstate or foreign commerce.

It is intended that these proposed regulations will cancel and supercede Part 7 of Interstate Commerce Commission Regulations for Transportation of Explosives and Other Dangerous Articles effective Jan. 7, 1941, and Part 7 of I.C.C. Motor Carrier Safety Regulations revised effective June 15, 1940, and all effective amendments thereto except provisions applying to safety of operation and equipment which are to be continued in effect in Motor Carrier Safety Regulations.

The hearing on these proposed regulations will be held in Washington on Sept. 18, 1941, at 10 o'clock A. M. (Eastern Standard Time) at the office of the Interstate Commerce Commission before Homer C. King, Assistant Director. At the request of the I.C.C. the Bureau of Explosives will be prepared to confer with interested parties at the Commission offices in Washington on Sept. 15th, 16th and 17th at 10 o'clock A. M. (Eastern Standard Time).

The proposed regulations cover the marking, labelling and packaging of dangerous articles for motor transportation. They also cover loading, storing and unloading of containers. Complete specifications for motor vehicle cargo tanks are included.

Department of Commerce Publishes Steel Drum Statistics for 1st 6 Months of 1941

Production of heavy type steel barrels and drums amounted to 8,227,642 during the first six months of this year, compared with 5,772,050 during the first half of 1940, the Census Bureau, Department of Commerce, reported recently.

Shipments totaled 8,240,897 in the first six months of 1941, compared with 5,787,784 during the corresponding 1940 period.

Unfilled orders at the end of June called for 1,213,920 barrels. Of this total 488,995 barrels were for delivery within 30 days and 724,925 beyond 30 days.

Production of light type steel barrels and drums during the first six months of this year amounted to 1,760,745, compared with 1,370,415 during the first half of 1940. Shipments during the first half of 1941 totaled 1,762,788, compared with 1,370,684 in the first half of 1940.

Texas Company Adopts New Type Fuel Drum

A new type of fuel drum has been adopted by the Marine Sales Division of the Texas Co. for special high test fuels they have developed for motor boat racing.

Drum is manufactured by Owens-Illinois Can Co. and is company's answer to the demands of customers for a container more fitted to marine use.

On a great many outboard powered boats and high speed racing hulls the fuel fill pipe is inconveniently located and the use of a funnel is usually needed. A feature of this can which particularly attracted Texas is the patented Tru-Pour spout which facilitates pouring even under the most adverse conditions. Exhaustive tests of pouring ability were made by the

company before the new drum was adopted.

Another important feature of the drum is its tamper-proof cap seal which protects

the consumer and assures him of receiving the contents in exactly the same condition as it left the refinery.

Lewis-Shepard Carboy Pourer

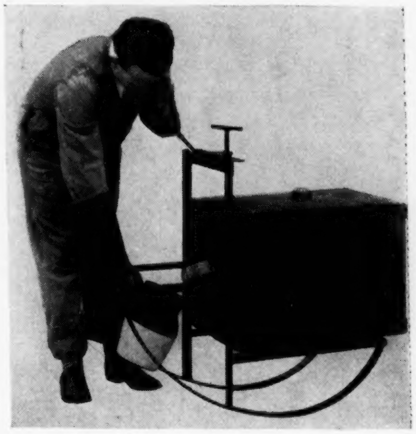


Illustration shows a Lewis-Shepard carboy pourer in service. The carboy pourer or tilter has been in use for many years and has proved to be of real service. This model has the attractive feature of a tilting handle which increases the safety of the operation. It can be obtained in 5-gallon and 12- and 13-gallon sizes.

Bracing of Carload Shipments of Oil Refinery Products

By A. R. Newton, Jr.

Shipping Supervisor, Quaker State Oil Refining Corp.

When the containers used in industry become scuffed or dented, it does not make as much difference as when these packages are subjected to the critical eye of the retailer. As the majority of our packs fall into the latter class (various sizes and types of cartons and drums) it is essential that they arrive at destination in perfect condition.

And since every year we spend many hours and dollars in research and careful production study to increase and maintain the high quality of our products, and reflect this in our advertising by attractive packaging, bracing carload shipments is a very important operation at the Quaker State Oil Refining Corporation plants.

To assure ourselves and most important, our customers, that orders will arrive without delay in good shape and that there will be no irritating correspondence regarding replacements, we have been using the "floating load" for about fourteen years. This is a method of car bracing based on the theory that loads withstand and survive shock better when they absorb rather than resist it.

All materials loaded into freight cars at our plants are carried into the car by means of a comprehensive conveyor system which has immeasurably increased our daily car loading capacity by eliminating much of the former handling.

The bulk of the cartons we ship, of course, carry our motor oils in refinery sealed cans and contain twenty-four one-quart or six five-quart cans. A carload consists of about eight hundred of these cases. To brace, the car is prepared in the following manner:

Three ¾" steel bands are laid on the floor from the center to the end of the car and then temporarily fastened to the walls as indicated in Figure 1. An eight by four foot gate constructed from 2 x 4's and 1" boards of unfinished hardwood is placed at the rear of the car as shown in the same illustration. The cartons which total approximately four hundred in each end of the car are stowed eight across and four high. Another gate, similar to the one at the rear, is then placed in position. The bands are placed in the correct position, tensioned and sealed as illustrated in Figure 2. The other half of the car is braced in the same way.

On drums of oil the bands are positioned and held horizontally by threading them through notched metal strips which have been nailed to the side and end walls of one half of the car. When bands are tensioned they are pulled from the car wall and remain against the load thus serving a second purpose by maintaining proper spacing between the bands to

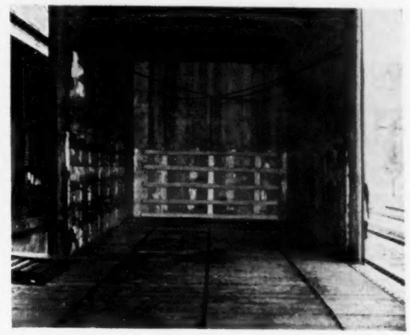


Figure 1. End gate in position with steel bands draped in car for quick, easy stowing. Note conveyor in lower left corner.

assure efficiency for the bracing throughout the journey. The drums are stowed in a staggered fashion so that each following row nests into the previous one. When loading is complete the bands are tightened and sealed.

Figure 2. The finishing touch completing the "floating load." Bands are tensioned and sealed.

We have had very good success with this method of car bracing. We call it our "Ambassador at Large" for safe-

(*Continued on Page 373*)

Figure 3. Half car of metal drums of oil "sealed" with steel bands into a unit that floats.

Foreign Literature DIGEST

By

T. E. R. Singer

ZHURNAL PRIKLADNOI KHIMII (Journal of Applied Chemistry) XIV, No. 4-5 (1941) pp. 435-45 and pp. 521-3.

Divinyl: A study was made by A. Balandin, N. Zelinski, O. Bogdanova and A. Shcheglova on the production of divinyl by the catalytic dehydrogenation of butylene in the presence of carbon dioxide diluted with nitrogen. Conditions were determined under which a 34% yield of divinyl was obtained, as compared to the butylene passed through, or 44% of the butylene decomposed. The reaction was carried out at atmospheric pressure at 600°, the time of contact being 0.3 seconds, and the butylene being diluted by the carbon dioxide in the ratio of 1:7.5 (volume). The yield in relation to the butylene passed through was 27% at 550°, and 82% of the butylene decomposed, the cycle of operations lasting for 2 hours. Other products resulting from the reaction in the presence of carbon dioxide are hydrogen and carbon monoxide and some ethylene and saturated hydrocarbons. Tables are given with statistical data on experiments conducted with various catalysts such as MgO, $AgNO_3$, V_2O_5, Al_2O_3, Cr_2O_3, ZnO, CuO, MoO_3 and mixtures thereof. Data are also given for experiments with variations in one or more conditions such as temperature, dilution, time of contact, etc.

Styrol can be produced by the dehydration of methyl phenyl carbinol in the vapor phase using an aluminum oxide catalyst made by precipitation from an aluminate solution with carbon dioxide. The yield of styrol obtained is 90% of the theoretical. The optimum temperature of dehydration is about 400°. The best yields of styrol were obtained at 380-400° and when the carbinol was passed through at a rate of 0.5-1.5 kg. per hour through 1 liter of catalyst. The quantity of styrol obtained per hour with 1 liter of catalyst increases in proportion to the increase in the rate of passage of the carbinol and attains 2 kg. when the carbinol is passed through at rapid rates. The activity of the catalyst increases to a certain maximum in the first hours of its utilization and then does not suffer any considerable decrease for a period of 10 hours of work. The dehydration of methyl phenyl carbinol in the vapor phase can also be carried out with the use of a clay activated by heating with hydrochloric acid, but its activity is definitely inferior to that of the precipitated aluminum oxide.

THE CHEMICAL TRADE JOURNAL AND CHEMICAL ENGINEER, Aug. 8, 1941.

A method for the production of methyl alcohol from sisal and similar plants of a fleshy nature is described in E. P. 537, 709. The patent indicates that a good yield of alcohol is recoverable from plants such as sisal, Phormium, tenox and aloe by a simple process involving boiling plants in weak solution of sodium carbonate and collecting vapors evolved.

Vegetable Oil Production in Brazil

A report appeared in the "Boletim do Conselho Federal de Comercio Exterior" (IV, No. 24, Rio de Janeiro, June 23, 1941) giving the quantity and value of certain vegetable oils produced in Brazil in the period 1937-1939. Some of these oils are as follows: (p. 6)

Oil	1935		1937		1939	
	Quilos	Milreis	Quilos	Milreis	Quilos	Milreis
Almond oil	121,900	250,120	86,478	481,469	104,546	359,429
Brazil nut oil	286,227	312,502	199,422	300,511	400,403	532,724
Coffee oil	......	......	......	......	1,042,893	1,564,340
Chestnut oil	105,980	123,263	59,245	74,519	114,906	142,106
Cottonseed oil	29,411,277	41,007,176	66,068,491	98,981,708	75,705,353	86,288,087
Coconut oil (pulp)	212,171	428,859	484,680	1,276,924	636,670	1,560,643
Babacu Coconut oil	6,623,628	14,155,173	3,596,987	12,248,276	5,342,603	13,283,504
Oil of various coconuts	1,278,115	2,774,258	1,318,613	3,460,032	1,284,855	3,151,410
Sunflower oil	......	......	......	......	72,542	290,168
Linseed oil	3,914,549	12,157,123	4,667,997	15,389,316	8,058,895	28,198,421
Castor oil	2,833,236	4,905,916	2,685,981	5,335,293	3,788,994	9,035,892
Nut oil	25,940	57,553	23,498	57,715	34,056	90,839

Industry's Bookshelf

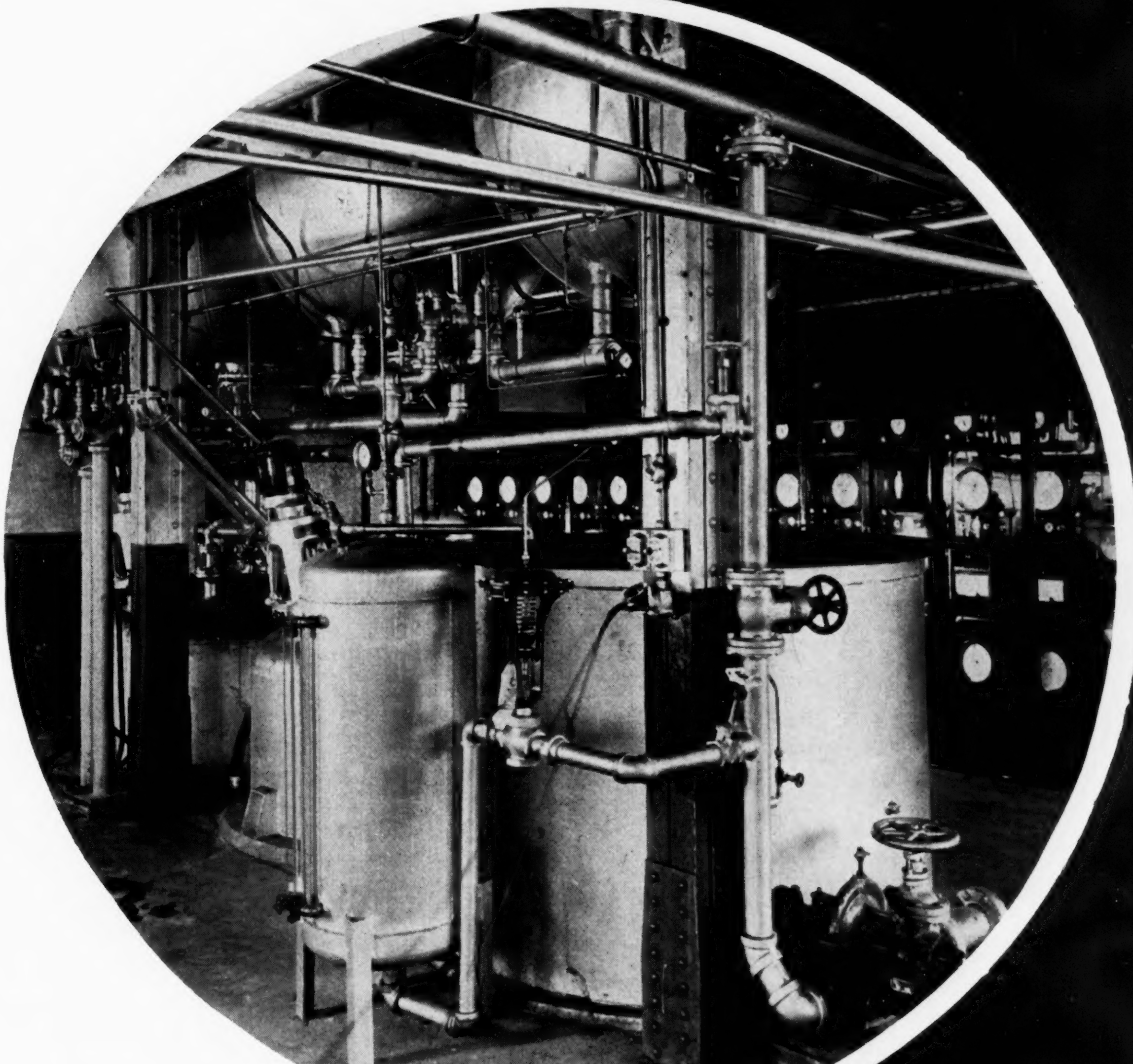
Industrial Plastics, Second Edition by Herbert R. Simonds, Pitman Publishing Corporation, New York, 385 pages, $4.50. In this second edition of a comprehensive yet semi-popular work, the author discusses all types of plastics.

Material on the Chemistry of plastics has been completely revised. Research, including some foreign work, and all tables, statistics and charts have been brought up to date.

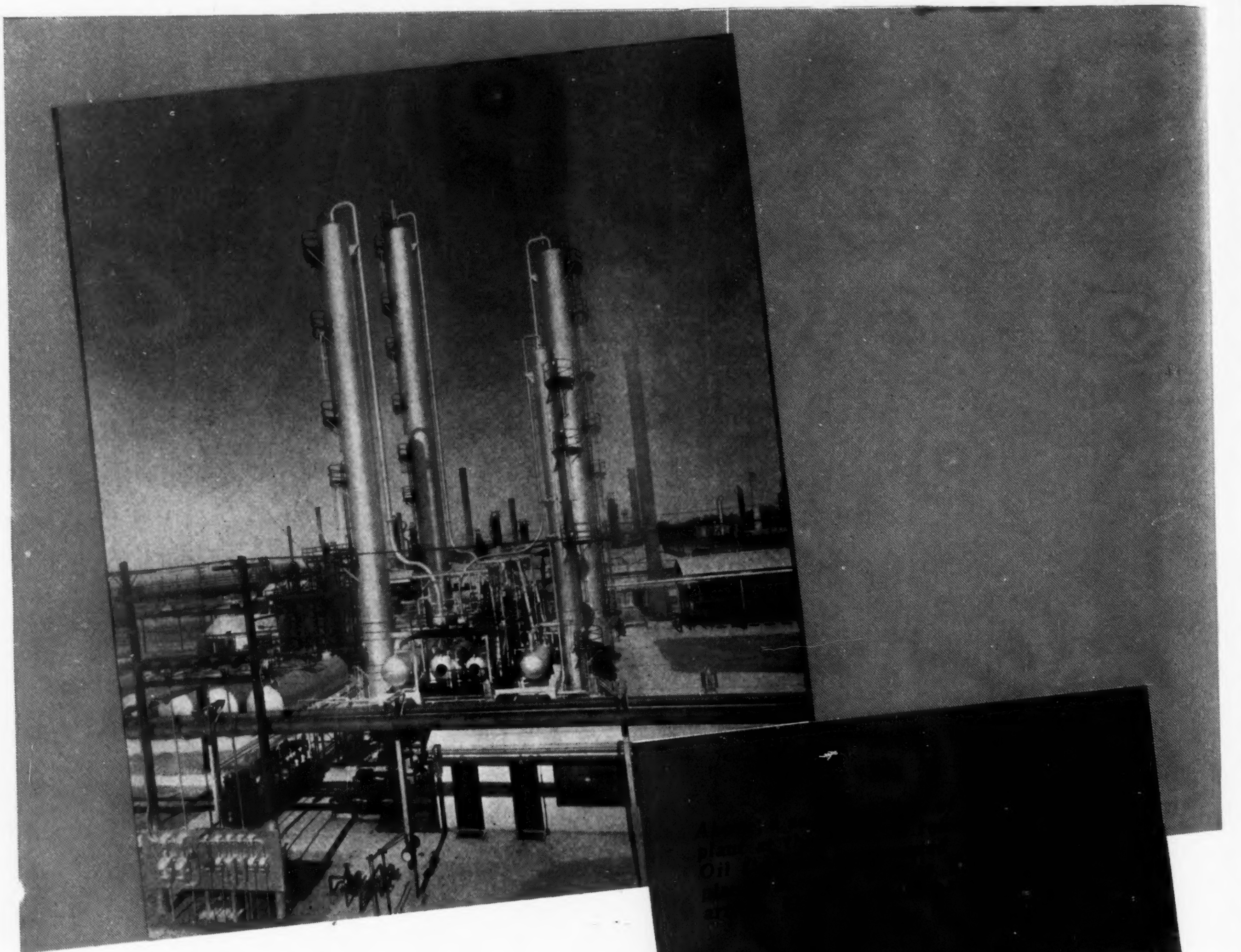
A list of chapters with the topics discussed in each will serve to give an idea of the content of the book. (1) Introduction to the Plastics Industry. History, Extent of Industry, Classification and Definition. (2) Basic Materials. Sources, Resins, Fillers, Pigments, Catalysts. (3) Ten Important Plastics. Phenolics, Acetates, Nitrates, Ureas, Styrenes, Vinyls, Indenes, Acrylates, Casein Plastics, Furfurals. (4) Molding Practice. Materials, Pressure Molding, Injection Molding, Cold Molding, Molding of Laminated Materials, Forming. (5) Fabrication of Plastics. Laminating, Joining, Plywoods, Veneering, Machining, Finishing, Home Crafts, Extrusion, Rolling, Casting. (6) Physical Properties of Plastics. Tests, Effect of Fillers, Resins, Standards, Ideal Plastics, Selection. (7) Plastics and Metals. Molders Must Know Metals, Complementary Materials, Designers' Problems. (8) Equipment and Plant. Tool Room, Molds, Hobs, Piling Machines, Molding Machines, Hot Presses, Injection Molding Machines, Materials Handling Equipment, Automatic Controls, Plant Operation. (9) Industrial Applications. Auto, Aviation, Architecture, Dental, Film and Camera, Furniture and Decoration, Electrical, Radio and Optical, Textile, Household Appliances, and Others. (10) Other Plastics and Borderline Materials. Natural Resins, Synthetic Waxes, Cellophane, Rubber, Coatings. (11) Design and Plastics. Principles, Knowledge of Materials, Color. (12) Future of Plastics. Some New Applications, Future Possibilities, Availability of Materials. Some Typical Research Problems, Plastics in Wartime. (13) Foreign Practice. England, Germany, France, Australia, Japan and others. (14) Chemistry of Plastics. Formulae, Long Molecules, Thermoplastics, Phenolics, Ureas. (15) Trade Names. Properties, Applications, Types.

NEW CHEMICALS FOR INDUSTRY

View below is of complicated control apparatus in process for making the synthetic rubber products of Hydrocarbon Chemical & Rubber Co., a subsidiary organized by B. F. Goodrich and Phillips Petroleum. For other photos of the process developed by Dr. Waldo L. Semon, see the article following, "After the Present Emergency—What?" (348-352)



Digest of Chemical Developments in Converting and Processing Fields



AFTER THE PRESENT EMERGENCY . . W

By John Morris Weiss

Pres., Weiss & Downs, Inc.

That the present situation will result in changes, especially in chemical technology, is a foregone conclusion. What will they be? How will they affect industry after the emergency is over? In this article several examples are given plus a forecast of what the trends may well be.

IT is not the intent of this article to consider in detail any of the changes which applied science has brought about in the past, but rather to speculate on the future changes, especially in chemical technology, which may result from the present situation and how such changes may affect industry, after this emergency is over. With this in mind, several examples will be considered and an attempt made to forecast what the trends may be in these particular instances.

It is, however, necessary to very briefly review some past happenings to give us a reference point from which to view the future. Prior to 1914 and the first World War, our synthetic organic chemicals and dyestuffs were, for the most part, imported from Germany. When imports were cut off, it became necessary for such production to be carried on in the United States. The urgent needs gave an impetus to chemical industry which it has never lost. It has become almost entirely self-sufficient, so that the present war, up to now, has hardly caused a flurry in any of those products which gave us such concern some twenty-five odd years ago.

The rise of synthetic organic chemical manufacture engendered many economic changes in other industries and these changes were both favorable and unfavorable, depending on the type of the business affected. Possibly, the most unfavorable consequences were in those lines depending on the recovery or refining of natural organic raw materials. The story of synthetic methanol (wood alcohol) and how it reduced the profit margin of wood distillers to the vanishing point is an old but not forgotten one and serves as a very striking example of unfavorable effect.

The well known and astounding increase over the past twenty years in the types and amounts of synthetic resin produced has had both good and bad effects on other industries. A substantial part of the

Last month, Henry Ford showed the world its first plastic automobile body. Plastic panels in this body design have an impact strength 10 times greater than steel. This body is still in the experimental stage.

growth of synthetic resins has been at the expense of natural gums and drying oils. It has greatly hurt the market for these raw materials. On the other side, however, it has opened up large markets for a number of products needed to make resins such as naphthalene, phenol, acetone, styrene, glycerine, and acetic anhydride. This has stimulated chemicals made from coal tar and petroleum.

At the same time, synthetic resins, by their availability, have entirely changed the face of our paint, varnish and lacquer industry in providing cheaper and better products, and it would require a volume to describe the developments where molded plastics have been of revolutionary importance.

Synthetic resins are certainly destined to further great future expansion. With the molded types of resins, there is a constant urge to increase their use in order to replace parts made of those metals which are essential in various phases of the defense program. In many cases, this shift from metal to resin is to the ultimate advantage of the article manufactured. Despite this, under ordinary circumstances there would have been a considerable lag in making the change because of the expense of special molds needed to produce the parts. But once an industry is standardized on parts of molded synthetic resin and has all the equipment necessary for the fabrication, the chance of it reverting to metal is comparatively small unless other impelling factors come into play. Such trends are bound to leave deep impressions on the post emergency sales and profits of many organizations.

But a very different defense develop-

Y. . WHAT?

ment may in some cases work against the resins. After the emergency we will have tremendously increased supplies of our light metals, aluminum and magnesium. These will be produced in tonnages which will render them available at extremely low costs after the emergency as compared to any time in the present or past. These metals will press for a use. Their probable competition, as it may influence such other metals as copper, has been recognized and it is very conceivable that they will also invade some fields of the synthetic resins themselves.

It may be, however, that other developments due to the emergency may make new and unexpected uses for these light metals. A tremendous advance in the airplane industry means that at the end of the emergency there will be considerable excess airplane producing capacity and mass production will have materially reduced the cost of the individual airplane. It is not fantastic to assume that numbers of these available planes will be used for freight transportation and compete with trucks and railroads in the carrying of everything except very heavy bulk material such as coal. Airplane transportation will call for lightness wherever possible so that the use of aluminum and magnesium for containers might well be tremendously stimulated by this development.

Now to turn to a specific chemical, toluol. In the first World War, toluol for tri-nitro-toluol (T. N. T.) was, as today, of vital interest. We had only a small immediately available supply, but a potentially large amount which could be recovered from our coke oven byproducts. These sources were tapped and by 1918 we were producing some 14,000,000 gallons of toluol per year or enough to make nearly 150,000 tons of T. N. T. Prices at the start skyrocketed from about 25 cents per gallon to a peak of $5.00 and this served as an incentive for the increased producing capacity. Later in the war period, consideration was given to increasing the supply by cracking petroleum and a start was made. This, however, did not advance beyond the stage of a pilot plant, which had indifferent success. After the war was over, the large supply of toluol for which recovery equipment had been installed, made it a quite cheap raw material begging for a market. The development of lacquers and quick drying enamels in the automobile and similar industries found in toluol an excellent solvent diluent. In time, this use absorbed such a large proportion of the material recovered that prices increased moderately and the market position became satisfactory.

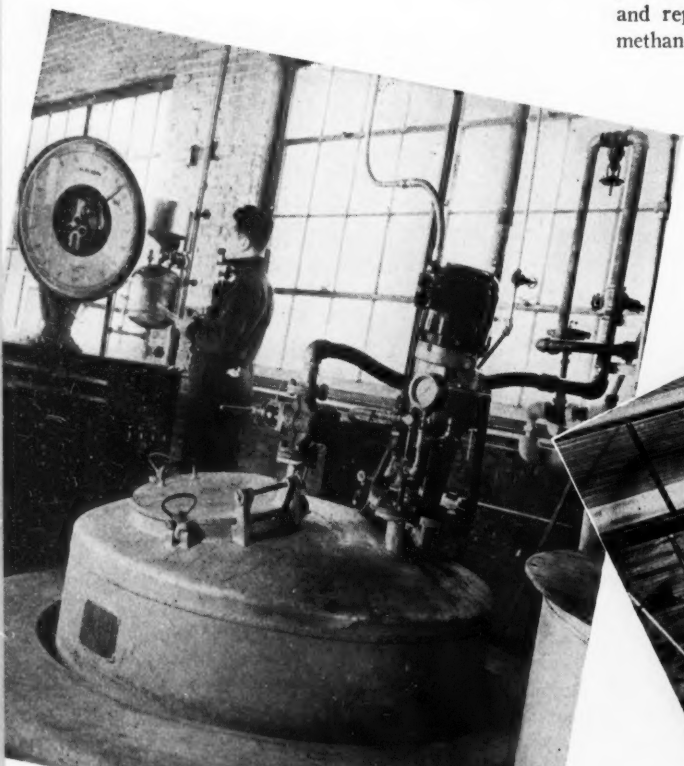
At the start of the present war, toluol was selling at around 27 to 28 cents per gallon and the United States production in 1939 was about 25,000,000 gallons. Export demand raised the price for export to about 30 to 33 cents per gallon, a very moderate proportion compared to the situation in 1914, while domestic prices have not increased up to the present time. The production has been increased so that currently the recovery from coke oven byproducts is in the neighborhood of 30,000,000 gallons per year. This is not enough for the Government demands for explosives and for other industry as well, so that, taking advantage of advances in petroleum technology, several large plants to produce toluol from this crude have been erected or are under construction by Shell Oil Co., Pan-American Petroleum and Transport Co., Continental Oil Co. and Humble Oil and Refining Co. These are stated to be designed to produce 37,000,000 gallons toluol per year. Other plants are under construction elsewhere which may be readily adapted to increase this supply. This is expected to avoid any stringency or immediate shortage of supplies.

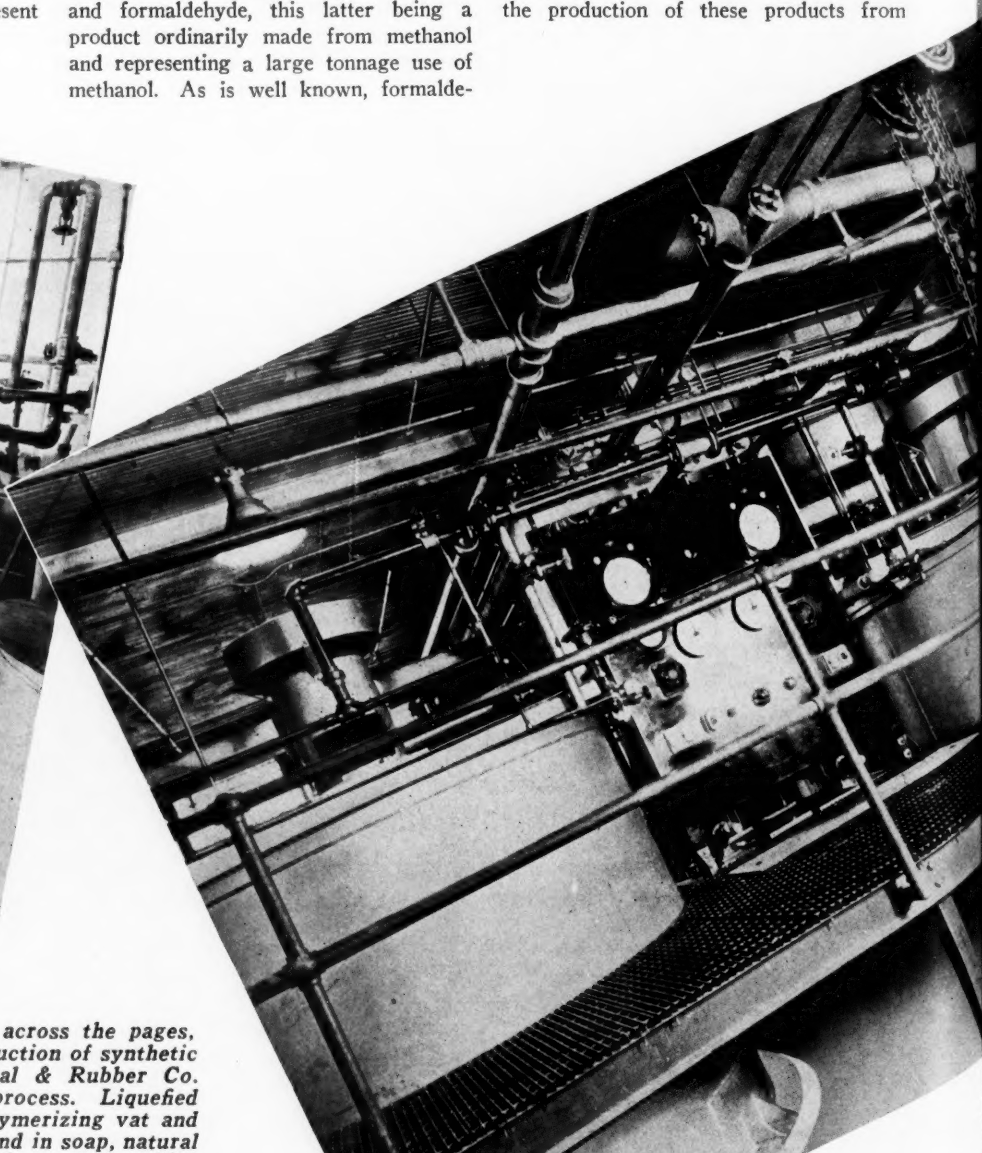
As the present war progresses, the needs for toluol will undoubtedly increase further and the product from petroleum, now calculated to fill about 55 per cent of the needs, will continue to expand. At the end of the emergency, it is quite likely that oil refiners may have capacity considerably greater than the coke oven byproduct source. It is hardly to be expected that the petroleum base plants will entirely cease operations at the end of the emergency. Although it might not have been good economics to instal these plants under ordinary conditions, yet when they are actually in existence, it may be quite economic to continue their operation.

This means that toluol may be expected to be an extremely cheap raw material after the emergency is over. Its price will probably stabilize somewhat above its motor fuel value, which may be regarded as a dump for the disposal of any material which cannot be sold in other channels. This should stimulate chemical uses for toluol at the expense of other materials. No doubt the cheapness will induce the lacquer industry to return to toluol. But this time the demand will be small relative to the supply. Other outlets will be needed. Much of our benzoic acid is made today from phthalic anhydride although prior to 1914 it was produced entirely from toluol. This war may reverse the process and bring toluol back into this field. Industries which could base some of their present products on toluol would be well advised to be prepared to do so and to determine the price levels at which a shift from their present raw material to toluol would be advantageous.

Another material which may show marked effects from emergency developments is synthetic methanol. Prior to 1930, this product had obtained unquestioned dominance over the product of wood distillation and the high pressure plants for synthesizing it from carbon monoxide and hydrogen, produced about 50,000,000 gallons of methanol in 1930. Around this time, a new method of treating natural gas was developing in Bartlesville, Okla. The object was to remove all oxygen from certain natural gases and thereby avoid pipe line corrosion. This was accomplished by adding a little excess air to the gas and then initiating a controlled combustion of a small proportion of the gas to remove all oxygen. A watery condensate was obtained which was determined to consist chiefly of methanol and formaldehyde, this latter being a product ordinarily made from methanol and representing a large tonnage use of methanol. As is well known, formaldehyde is an essential constituent of the "bakelite" type resins. The Cities Service methanol and formaldehyde were byproducts of no value as produced, and as such, they obviously preempted the initial place in the general market. To the extent they were produced, the product of the high pressure synthetic plants of duPont (then Roessler and Hasslacher Chemical Co.), Union Carbide, and Commercial Solvents had to stand aside. With the growth of the synthetic resin industry however, there was soon room for all, and over the years since 1930 the material from this source increased as more natural gas was treated.

In the present emergency, with the possibility of converting present high pressure methanol plants to ammonia production, and the long delays incident to the procurement of high pressure equipment, there is every incentive to increase the production of these products from





These shots, from left to right across the pages, show additional steps in the production of synthetic rubber at Hydrocarbon Chemical & Rubber Co. Above is the beginning of the process. Liquefied butadiene is passed into the polymerizing vat and mixed with other ingredients found in soap, natural gas and air. Right, the coagulating vats in which the curds of synthetic rubber are coagulated into a semi-solid sticky substance like cottage cheese. On other page, the final process—milling the curds of synthetic rubber into sheets of the standard size. Hydrocarbon plant is now turning out synthetic rubber at the estimated rate of 7,500 tons a year.

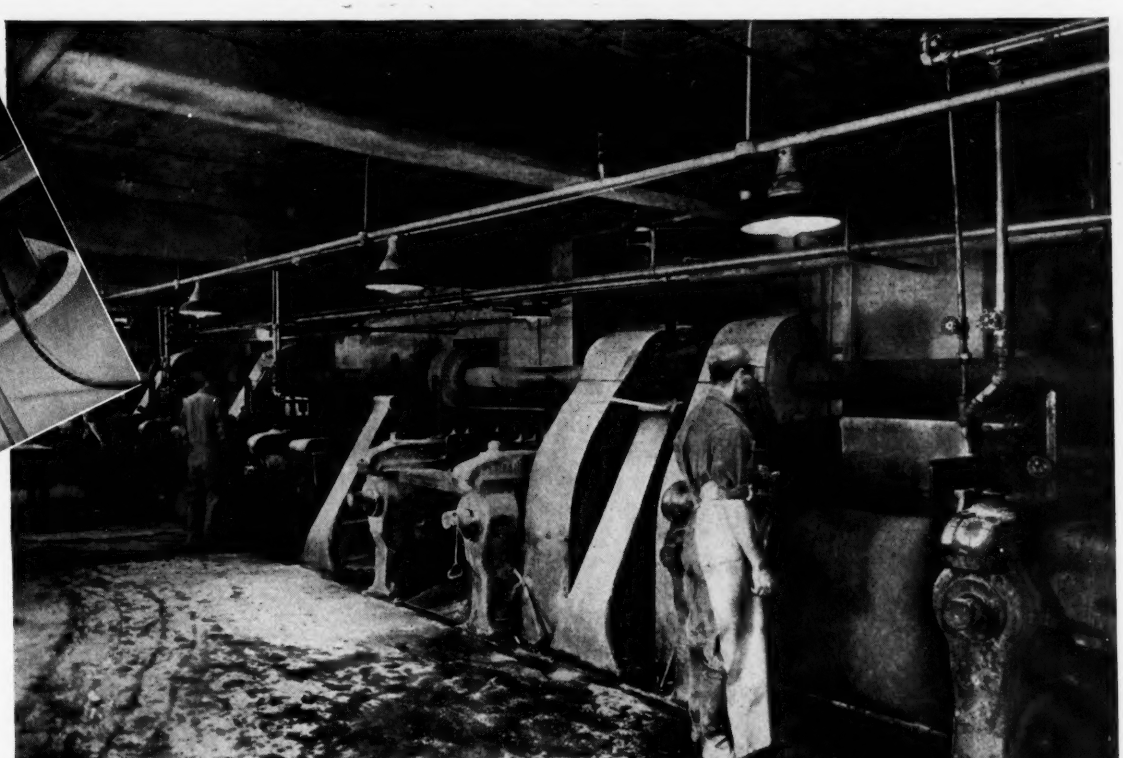
natural gas and hereby free the high pressure equipment for other purposes. The demands for formaldehyde and for methanol to make formaldehyde has been accelerated by the increasing use of phenol formaldehyde resins in defense products and at this writing, there is a very definite shortage of both methanol and formaldehyde. The methanol and formaldehyde production from natural gas is estimated at present at from one fourth to one third of the total United States production. With increases in capacity, this source may take over a much larger proportion of the business. After the emergency, such natural gas plants will be in existence and in competition with the high pressure plants for a probably reduced market. They will certainly tend to limit the growth and output of the high pressure synthesis. It would appear conservative for companies now operating high pressure equipment for methanol to give consideration to other not so competitive lines where the high pressure equipment would be adaptable, so as to have some insurance against the development of a situation where they would find themselves in a substantially disadvantageous competitive position.

Another subject, which has many angles of interesting speculation, is the developing industry in synthetic rubbers. The Standard Oil of Louisiana (a Jersey subsidiary) is erecting a plant at Baton Rouge, La., to produce 15,000 tons per year of synthetic rubber products and raw materials, including 5,000 tons per year of butyl rubber and in addition some 20,000,000 gallons of synthetic alcohols, of which about 16,000,000 gallons will be ethyl alcohol and the balance isopropyl alcohol. The development has very pregnant possibilities. The alcohols are to be produced from ethylene and propylene, byproducts of the operation. The operations really start with the cracking of certain petroleum fractions to produce gases containing high percentages of unsaturated hydrocarbons, certain of which are separated and form the raw material for synthetic rubber. Other unsaturates, especially ethylene and propylene, are separated as well and as byproducts can go into further operations at very low costs. The operation of this one synthetic rubber operation which would produce less than one per cent of the 1940 reported United States use of crude rubber may be contrasted with the fact that the proposed ethyl alcohol production of 16,000,000 gallons is very substantial in relation to a production in the fiscal year ending June 30, 1940, of fermentation alcohol (mostly from molasses, the waste product of the sugar refiners) of about 91,000,000 gallons with about 31,000,000 gallons additional synthesized from ethylene by Union Carbide. The position of the present alcohol producers after the emergency may be very radically affected by such technical developments. Union Carbide would be affected further in other directions. One of their most profitable chemicals, ethylene glycol ("Prestone") as well as a variety of less well known products, are based on ethylene as a raw material. The availability of large amounts of cheap ethylene, which is most economically utilized at the source, introduces new and unknown competitive factors.

The effects however do not stop at these products since acetic acid and acetaldehyde can be and now are produced from alcohol, in competition with acetic acid produced from calcium carbide. More and cheaper alcohol may throw the balance markedly against the carbide process and displace it as it displaced the acetic acid formerly made from the byproducts of wood distillation.

More and cheaper acetic acid may change the picture in the field of synthetic fibres. Cellulose acetate rayon has been growing at a much faster rate than the older Viscose rayon. Cheaper raw materials and improved processes may further accelerate the trend so that the evenual repercussions of synthetic rubber may shake the textile industry.

The propylene made along with the ethylene will also exert economic pressure. The logical present outlet for propylene is ispropyl alcohol, used in part as an antifreeze in car radiators but to a greater amount for the production of acetone, a solvent used in smokeless powder. All such products are likely to be plentiful and extremely cheap after the emergency. They will undoubtedly press



for a market and cause deep seated changes in industry.

In addition to the rubber development of the Standard Oil of Louisiana, several of the rubber companies are active in the synthetics and there are at least four plants, stated at a capacity of 2,500 tons synthetic rubber per year each, being initiated under Government sponsorship. These are to be arranged for material enlargement to 10,000 tons each and it is not likely that this represents the limits of these developments.

Even a moderate proportion of the United States rubber requirements produced synthetically would give an almost unbelievable tonnage of chemical raw materials required and the byproducts available would be such a major potential factor that almost all branches of the chemical industry and of many other industries would have to reckon with it. The rubber companies may themselves work up their byproducts and become important chemical factors, just as have certain of the oil refiners, notably Standard Oil Company of New Jersey and Shell Oil Co. New producers, new materials and new procedures will be available to industry and the effects will be felt by many who do not realize that their business has any relation to chemical technology.

In addition to the repercussions of synthetic rubber byproducts on the textile industry in making cheap acetate rayon, it is unquestioned that purely synthetic fibres such as nylon will have a tremendous growth, especially since imports of silk from Japan have been almost entirely cut off. It is not inconceivable that products such as nylon will reach tonnages approximating some of the rayon fibres and call for more and more of the raw materials made from coal or from petroleum. More and more man made products will invade the field of nature.

These synthetic fibres are also naturally in competition with natural farm grown products such as cotton. Agriculture, however, is undoubtedly going to see deep seated changes due to the impact of technology under emergency conditions. Other crops must substitute for displaced materials. The practice of the dehydration of foodstuffs is advancing to ease the transportation problem. This will undoubtedly have an effect in rendering farm products in dehydrated form available to factories as raw material. Dehydration of agricultural products at the source, by reducing transportation cost, renders it possible to deliver them at large scale low cost processing factories and many products not now produced from these sources will come into being. Much has been done along these lines under the sponsorship of Henry Ford but much remains yet to be done and the breadth which this development may take challenges the imagination.

John Morris Weiss

The use of vitamins in food, which is being tremendously stimulated by the nutritional requirements of the emergency, may open up entirely new lines of synthesis and revolutionize the processing of foods. Next year, a law goes into effect that will require the addition of riboflavin, a vitamin, to all white bread and to certain other processed foods. The country's capacity to produce this vitamin product does not appear such as to permit immediate enforcement of the law. The recognition of the importance of adequate nutrition of our population, both human and domestic animal, is bringing new demands to the chemical industry. New procedures, new materials, both raw and finished product, will be required and new opportunities will be opened in quarters that are probably unsuspected at the present.

Perhaps the most profound change that is taking place and the one that will ultimately have the most profound effect on the industrial life of America in the decades to come is the stimulation by the Defense Program of the industrialization of the Pacific Northwest, the Boulder Dam area and the Tennessee Valley and to a slightly lesser extent the Midwest and the Southwest.

The tremendous hydroelectric power developments at Bonneville, Grand Coulee, Boulder Dam and in the Tennessee Valley raised the question "Where are the industries to come from to utilize this power?"

The National Defense has proven a perfect answer to this question and has solved a problem for the New Deal that even two years ago had all the earmarks of a first-class headache. While much of this new development ultimately will mean greater over-all industrial output for the country as a whole some of it at least will be achieved only at the expense of the highly industrialized East. The plant expansion program of the country in the Far West, South and Midwest can only mean new transportation problems, dislocation of present markets and the establishment of several new ones.

Such construction also poses another problem. Will the government operate many of these plants when the emergency is over or will it dispose of them at fire-sale prices? Will established manufacturers find the government an active competitor or will some new group or groups be in on the ground floor at ten cents on the dollar? Will Muscle Shoals be duplicated a hundred-fold in the next decade?

The chemical industry as a whole and the applications of chemistry to industry not generally regarded as chemical will receive even more recognition than it has today. In the first World War, chemical industry was almost entirely a producer of manufactured raw materials. Its products almost without exception were used in other industrial operations. Today the situation is quite different in that many chemical products go directly to the consumers and are known as such by them. This has aroused a more general public interest in the chemical industry. This tendency is bound to increase the present emergency. There will be a better understanding of the situation on the part of the ordinary man in the street. Much of the mystery which held over the chemical industry in the early days of the first World War has been dispelled and the present war will probably complete the process. Queer names will have a meaning to the ordinary man.

It will be good policy for all manufacturers, large and small, regardless of their field of activity, to review what they now buy and sell and how those articles may be affected by the changes which will result from the unusual activities during the emergency and which will present a pressing problem once the emergency is over. What new raw materials are they likely to have, which they must adopt to keep their products on a competitive basis, price-wise or quality-wise? What can they make with their present equipment to take advantage of the changed nature and availability of raw materials? How will developments in the rubber industry affect the refiners of sugar in Cuba? Will the products made from coal or from petroleum have a serious effect on the demand for steel? Will the midwestern farmer be essentially a competitor of the industries related to electric power so that our large dams on the one hand give water to the farmer and on the other hand produce products to replace his produce?

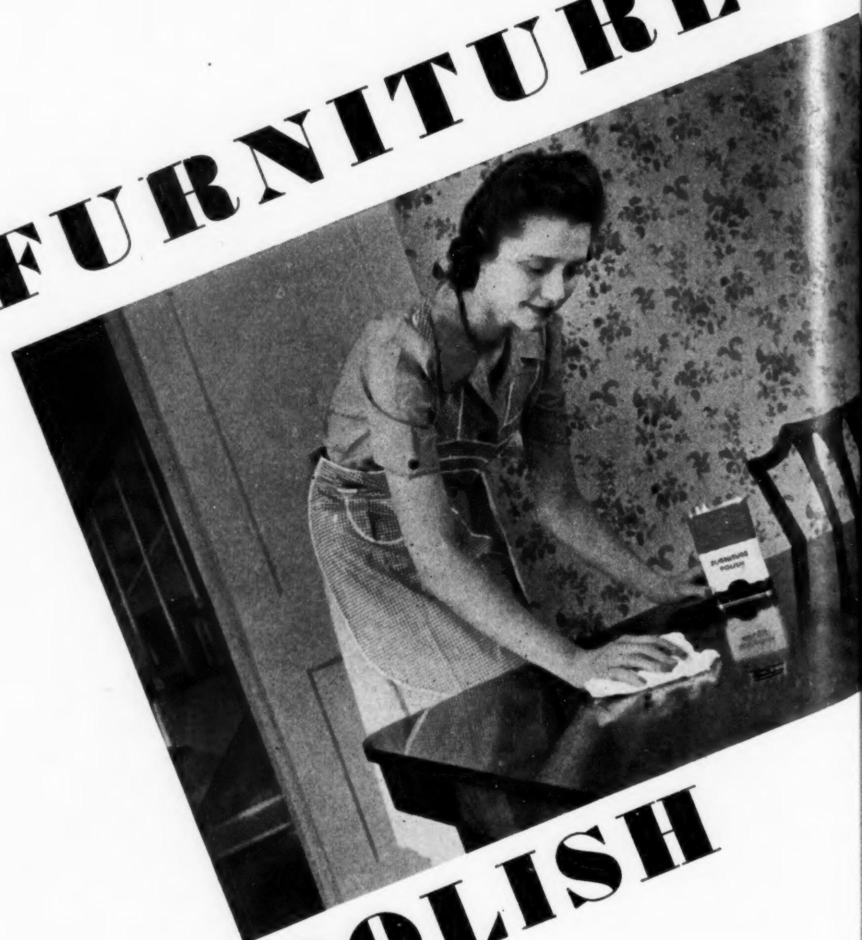
The inter-relationships of industry are such that no one is exempt from the effects. Those, who most nearly anticipate the trends and prepare before the situation is an actual one, have the best chance of survival.

CHEMICAL SPECIALTIES

Speed-O-Print Duplicating Ink, product of Speed-O-Print Corp., Chicago, is a uniform, free-flowing, quick-drying product which requires no thinning or doctoring. It will not spread or leave an oily outline. Comes packaged in a Phoenix cone top can, lithographed in black, red and gold, sealed with ST type cap.

INDUSTRIAL • HOUSEHOLD • AGRICULTURAL

FURNITURE POLISH



Furniture polish, author Small says, is essentially a fairly simple specialty. It should be designed solely to clean and polish furniture and not for a hundred other uses. This is a complete story and a good one on what goes into furniture polishes and what they do.

TO clean furniture and to give it luster—that is the function of furniture polish. Because of the nature of the finish on furniture, cleaning can be accomplished by simple dusting, but the owner of good furniture wants more than this. He or she wants it to have a high reflectance,—a polish, to keep it looking new, attractive and well cared for. Dusting alone will not do this,—washing certainly will not do it, and as the physician says, is "contraindicated."

Furniture polish should be designed solely to clean and polish furniture. A good furniture polish is not a good automobile polish, nor a good floor polish, both because the finishes to be polished are different and because the soil to be removed is different. An automobile polish is expected to remove solid adherent dirt consisting in part of decomposed surface finish from the car itself. In order to get this off, a polish containing abrasive is needed, something that can attack and loosen the soil by friction. Abrasive of silica or other finely divided solid material is not necessary nor desirable for polishing furniture. Even if soft enough not to scratch, it will be deposited in carvings and grooves, from which it is removed with difficulty, besides serving no good purpose.

Floor polish, in turn, is of quite a different type. It is intended to leave a protective film of wax on the floor—which has previously been cleaned in a separate operation—to give longer wear to the finish beneath it. Water-base floor wax which is self-polishing in that no rubbing is required, is used almost entirely. A hard film of wax is left which will resist wear from walking for some time. Because of these considerations it seems a mistake on the part of the manufacturer to label his product "For furniture, woodwork, floors, linoleum, automobiles, and all varnished and lacquered surfaces". No product is that versatile and we doubt that anyone believes such claims.

In order to give luster to furniture, a light film of oil is desirably deposited by the polish. Many housewives use an inexpensive product which they buy as "lemon oil", which they apply to their furniture, as well as to their floor with a dustmop. This oil is really light mineral oil of the general nature of kerosene, containing sufficient citronella to give it a marked lemon-like odor. A product labelled "Furniture Polish," however, commands more respect from the housewife, and a correspondingly higher price. An example is a commercial product which retails for 45 cents for a 12-ounce can of straight mineral oil, which is colorless and has a specific gravity of 0.8420 at 60°F. Directions with this are to apply with a soft cloth "slightly dampened with water". This recognizes the fact that oil alone does not clean, a point which we shall come to later.

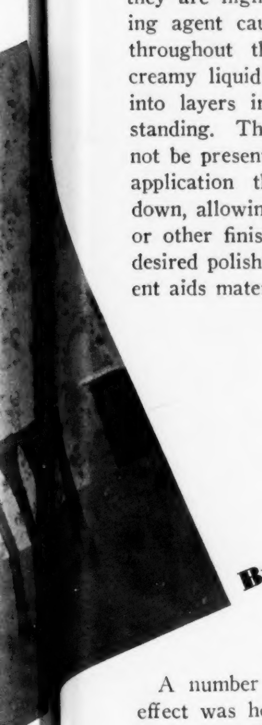
A product consisting of oil only, requires a good deal of rubbing afterward in order not to leave the furniture too oily. If too much oil were left, this would collect and hold dust and dirt and be objectionable in itself, detracting from the luster of the finish rather than enhancing it. An oil product containing organic diluents has the following formula:

Light spindle oil	60%
Red oil	3
Benzol	15
Methanol	20
Pine oil	2

Spindle oil is a light-bodied lubricating oil having a viscosity less than 100 seconds Saybolt at 100°F., and is suitable for furniture polish in general. Oleic acid is believed to increase the wetting power of oil for a varnished surface. Benzol and methanol are volatile diluents to make the material less oily. Pine oil is a popular odorant, although any inexpensive oil such as citronella, rosemary, sassafras or suitable combinations, can be used. This product would not have as great a cleaning action as an emulsion.

Oil Emulsions

This brings us to the more typical and far more numerous polishes, which are emulsions of oil in water, of which many commercial examples have proved successful. Because they clean as well as polish,



they are highly practical. An emulsifying agent causes the distribution of oil throughout the water phase, giving a creamy liquid which should not separate into layers in the bottle, even on long standing. The emulsifying agent should not be present in any great excess, as in application the emulsion should break down, allowing the oil to wet the varnish or other finish preferentially, to give the desired polishing effect. The water present aids materially in removing dirt.

By C. T. Small, Ph.D.

A number of years ago this cleaning effect was heightened by inclusion of an acidic ingredient,—such as vinegar, which contains 4 per cent of acetic acid, a relatively strong organic acid, or antimony trichloride, a salt which hydrolyzes in aqueous solution to give a small and controlled concentration of hydrochloric acid. Such acid ingredients are seldom included in present-day polishes as they are not really necessary to get the desired cleaning action. Emulsions give a much better appearance. Acid is inimical to many emulsifying agents, another reason for omitting it.

The polish is applied with one cloth, then rubbed up with a clean dry cloth. In this way the water is wiped off, with it the dirt, while a very thin film of oil remains. A number of emulsifying agents are used including soaps of various kinds, proprietary emulsifiers, and substances like gum tragacanth. Even sulfonated oil is used, although this has to be present in much greater amount than ordinary emulsifiers. Sometimes more than one kind of emulsifier is present.

A commercial polish illustrating the last point has approximately the following composition:

Sulfonated petroleum oil	2%
Sodium oleate soap	4
Light mineral oil	38
Red oil	3
Water	53

The red oil and mineral oil are emulsified in the water by the two agents, sulfonated petroleum oil and soap.

In making an oil-in-water emulsion, the water phase is customarily put in the kettle first, the emulsifying agent dissolved in this, then the oil phase stirred in. If soap is used, this is usually formed in the process, starting with the fatty acid, not the glyceride, dissolved in the oil phase,—with the caustic or other alkaline agent dissolved in the aqueous phase. On mixing, reaction occurs and soap is formed. A simple basic formula is the following:

Mineral oil	50%
Ammonium oleate soap	3
Water	47
Pine oil as odorant	

Oleic acid or red oil is dissolved in the mineral oil, ammonia dissolved in the water, and the former added to the latter with mixing.

A commercial product containing an organic diluent as well as mineral oil and water is as follows:

Light blown castor oil	10%
Light mineral oil, sp. gr. 36° Be.	20
Xylene	9
Potash soap	1
Water	60

Blown castor oil is quite different from ordinary castor oil; the latter would not be a satisfactory ingredient because of its somewhat sticky nature. Blown castor oil has had air blown through it to cause some oxidation. Xylene is a solvent and diluent for the mineral oil. Water further reduces the concentration of mineral oil, the polishing agent, to the point desired. Potash soap is the emulsifying agent.

Another form of soap is one made with triethanolamine as saponifying agent, as in the following:

Mineral oil	25%
Naphtha	10
Stearic acid	4
Triethanolamine	2
Water	59

The stearic acid is melted and the naphtha and mineral oil mixed and stirred into the warm stearic acid. Naphtha is a solvent and diluent for the mineral oil. The triethanolamine is dissolved in water and the solution warmed separately to about 140°F., then gradually added with stirring to the oil mixture.

With a water-soluble gum as emulsifying agent only a small proportion is needed, and the amount of water present can be relatively high:

Kerosene	5%	Gum arabic	1%
Light mineral oil	5	Gum tragacanth	1
Glycerine	4	Water	84

Glycerine serves as a wetting agent, the other ingredients corresponding to those in previous formulas.

Wax Emulsions

A number of people consider that wax in a polish stands for high quality, and to a certain extent this is true. The great demand is for oil-emulsion polishes because these are quick-acting, easy to apply and rub up, and satisfactory as to results. To meet a more limited demand, usually one which concerns the polishing of very fine furniture, products are prepared containing wax in varying amounts. These require much more rubbing in order to get a smooth thin application of wax.

Wax emulsions are usually thicker than oil emulsions, and usually contain volatile solvent as dispersing agents for the wax. Soft waxes like beeswax have been used, but a hard wax like carnauba is more suitable, or rather a mixture of hard and soft waxes. The wax and oil together are deposited as a light film on the furniture, a small proportion of wax giving a more permanent gloss than that obtained with oil alone. A simple formula is as follows:

Light mineral oil	56%
Potassium stearate soap	1
Mixed waxes	3
Water	40

A suitable mixture of waxes consists of carnauba wax and paraffin—the softness of the latter aids in spreading the hard carnauba. Refined carnauba wax should be used, even though other grades are cheaper; Yellow No. 1 is preferable. Poor grades cause the product to be off-color because of dirt in the wax. The waxes are melted and stirred into the mineral oil, the rest of the procedure being much the same as for straight oil emulsions. A product containing wax is desirably cooled as quickly as possible in order to produce fine rather than coarse crystals of wax in the finished product. The finer the wax particles, the more homogeneous the emulsion and the more satisfactory the application.

Packed either in bottles or in tin cans with an attractive label, polishes have established a respectable price. Of two very similar products, each containing less than 50 per cent of mineral oil—slightly less than 15 per cent of sulfonated castor oil as emulsifying agent, and the balance water—one sells for $1.00 a quart, the other for 39 cents a pint. Oddly enough, the one having the higher water content and lower proportion of active ingredient, is the higher priced.

Polishes made with sulfonated oil are much more oily and less creamy than the emulsions made with more active emulsifying agents. If sulfonated oil is used, it should be one that is highly sulfonated and that has been carefully neutralized following sulfonation. For this purpose ammonia is a better neutralizing agent than caustic soda, the ammonium salt being somewhat more desirable in the polish.

Some of the products are colored with a dye, such as blue, pink, green. The idea is probably to differentiate the product, the color setting it apart in the mind of the user as being distinctive.

Essentially, furniture polish is a fairly simple specialty. Such variations as the manufacturer wishes to make should be such as to be compatible with the basic ingredients. The above discussion illustrates what these are, as well as suitable proportions. A practice which can not be condoned and which has been indulged in by only a few manufacturers, is to label a product a wax polish when the amount of wax present is so infinitesimal as to be practically undiscoverable by a good analyst. The compounder's imagination can be put to better uses than this!

ADVERTISING PAGES REMOVED

CHEMICAL SPECIALTY News!

Manufacturers of Disinfectants, Insecticides and Allied Sanitary Chemical Products Not Affected by 40 Cents Wage Minimum—New "Soap Samplers" Distributed—Dye-Crete Cement Method—Borden Company Creates New Vitamin Products Department Here

THE National Association of Insecticide and Disinfectant Manufacturers, Inc., has informed its members that the minimum wage scale for manufacturers of insecticides, disinfectants and allied sanitary chemical products is still 30 cents per hour under the provisions of the Wage and Hours Law. Confusion as to the extent of the recently established 40 cents drug wage minimum had led some members to believe that they might be included under the Drug Group by the Department of Labor.

Such products which do have drug applications, when and where the labor involved in their manufacture is separable, may bring certain departments of a plant under the 40 cents scale. But these products must be held out for medicinal uses. A cattle or sheep dip, for example, used solely to kill ticks and other insects on animals, even though used on an animal body, would be classified as an insecticide. The same rule is true for cattle sprays, flea powders, etc. The definitions of drugs and toilet articles under the new 40 cents wage edict of the Department of Labor follow those of the Food, Drug and Cosmetic Act.

Below, in part, is the statement of the Department of Labor addressed to NAIDM, covering their ruling on the status of insecticides (no differentiation is made between household and agricultural insecticides):

"The wage order, effective July 7, 1941, provides that all employees engaged in commerce or in the production of goods for commerce in the drug, medicine, and toilet preparations industry as defined shall be paid a minimum wage of not less than 40 cents per hour. Your attention is called to the definition on page 2 of this wage order, section 600.4, paragraph 1, showing the coverage of the definition which states that the industry includes 'Drugs or medicinal preparations (other than food) intended for internal or external use in the diagnosis, treatment or prevention of disease in, or to affect the structure or any function of, the body of man or other animals.

"In order to determine whether or not any product is covered by this definition, it will be necessary for the manufacturer to determine whether it falls within the meaning of that paragraph. The definition is not intended to cover the chemical industry as an industry nor the disinfectant and insecticide industry. However, no blanket ruling can be given in reference to the coverage of groups of products closely related to drugs and medicines. There is apparently no clear line of distinction between drugs, disinfectants, and insecticides insofar as the above definition applies to such groups of products.

"If a manufacturer produces a substance which he calls fly spray and which he indicates is intended to kill flies, but at the same time he indicates is intended to prevent disease in animals, or will improve their bodily health or appearance, or in some other way affect 'structure or any function of, the body of man or other animals,' such a product would apparently be ruled as coming within the meaning of the definition. This in spite of the fact that it is not the intent of the definition to cover all chemical compounds which would destroy flies. The same type of argument applies to insecticides and disinfectants.

"In general, disinfectants are not designed or intended for application to the body of man or animal. However, the manufacturer of such a product who indicates on his label or by other means that his product may be applied internally or externally for the prevention of disease, or to affect 'the structure or any function of the body of man or other animals' would be presumed to be subject to the wage order and his employees in so far as they are engaged in commerce or in the production of goods for commerce would be entitled to a minimum wage of 40 cents per hour.

"In general fly sprays, insecticides and disinfectants which do not fall within the meaning of this definition would not be covered by the wage order, and employees in those industries would be entitled to the statutory minimum of 30 cents per hour in so far as they are engaged in commerce or in the production of goods for commerce."

New "Soap Samplers"

National Oil Products Co., Harrison, N. J., has just distributed 10,000 pliofilm packets called "Soap Samplers," containing three types of low-moisture soaps, together with explanations of the grain sizes, colors and all other characteristics. Distributed principally among the wire-drawing and metal working trades, laundries and manufacturing chemists, each packet contains a sample portion of granular, crystalline and powdered soap.

New Cement Stain

Wilbur & Williams Co., Boston, Mass., has developed a method to color and make dust-proof concrete floors and have the color become actually part of the cement. Known as Dye-Crete, the method uses not a paint but a stain which penetrates deeply into the concrete. When the cement wears down, it remains the same color.

Used in the method are two products, Dye-Crete Stain and Dye-Crete Defensite Coating, supplied in four colors. The coating is a synthetic enamel which adheres solidly to the stained concrete and is not affected by moisture or lime and is resistant to alcohol, gasoline and other chemicals. First application is a top coating, second a gloss.

NPCA Gets Invitation

The National Pest Control Association which is to have its meeting in San Francisco, Oct. 27, 28, 29, has been invited to have its members visit the California Academy of Sciences, Golden Gate Park, either individually or as a group when in the city. Robert C. Miller, director of the academy, sent the invitation and offered to provide a personal welcome and explanation of some of the work being carried on at the museum.

Soap Buying Guide

Colgate-Palmolive-Peet Co., Jersey City, N. J., has issued a new and complete catalog of soaps and detergents, a "Soap Buying Guide," which is available to all industrial users of soaps and soap products without charge. It may be had by writing to the Industrial Department of the company.

Back From Honeymoon

Francis J. Licata, chief chemist of the Metasap Chemical Co., subsidiary of National Oil Products Co., has just returned to the Harrison, N. J. plant from a honeymoon trip with his bride, the former Henrietta Callari, of Jackson Heights, L. I.

Insecticide Research

Latest Crop Protection Institute Circular (Vol. XV, No. 3) compiled by J. J. Davis, Purdue University, Lafayette, Ind., was released recently under the title "Why the Increase in Insecticide Research?" A 6-page report, the circular contains a complete report on the increasing scope of this research, especially along the line of insecticides and fungicides.

Borden Company Creates Vitamin Products Dept.

Charles F. Kieser, manager of the special products division, the Borden Company, announced recently the creation of a vitamin products department and the appointment of Harry McNeilly, industrial engineer, and former vice-president of Scott & Bowne Vitamin Corp., as its manager.

Mr. Kieser's announcement said, "The company will manufacture and sell certain vitamins, particularly Vitamin A and Vitamin D, derived from natural sources, for food and feed fortification. As needs develop, other vitamin products will be added to this department's activities, which will be directed by Mr. McNeilly."

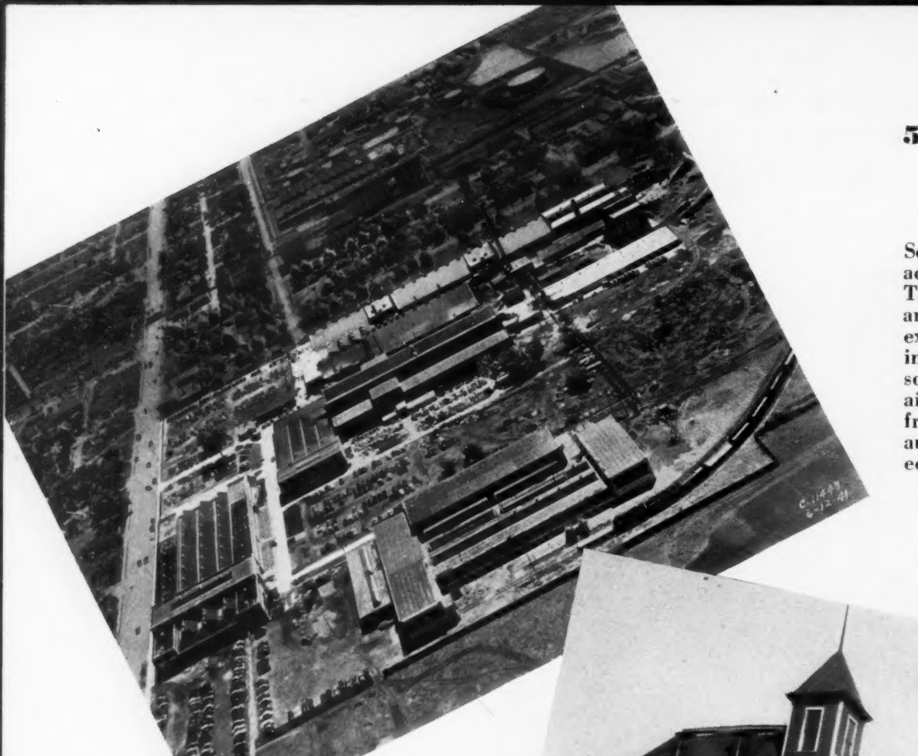
Headliners in the News

Seymour W. Ferris, chief chemist, Atlantic Refining Co., chairman of the general arrangements committee for the 102d meeting of the American Chemical Society at Atlantic City this month. (Above)

From top to bottom: Fred H. Haggerson, newly-elected director of Union Carbide and Carbon Corp.; R. N. McAdams, recently elected secretary of Hercules Powder Co.; W. N. Williams, advanced from manager of sales to assistant to president, Westvaco Chlorine Products Corp.; J. Rivers Adams, appointed manager of sales, Westvaco; D. G. Baxter, general superintendent in charge of Copperweld Steel Co.'s Warren, O., plant. (Right)

Top left, Walter D. Kane, in charge of Innis, Speiden & Co.'s new branch office in Cincinnati; top right, Walter E. Baumeister, now in charge of that company's Cleveland office; bottom left, William H. Elliott Jr., who is now on Innis, Speiden's New England sales force; bottom right, Howard Hogan, M.D., newly-appointed director of the new department of Medical Research, S. B. Penick & Co.

Right, 12 recent college graduates who are now in the central technical laboratory of Armstrong Cork Co., Lancaster, Pa., training for work in specific departments. →

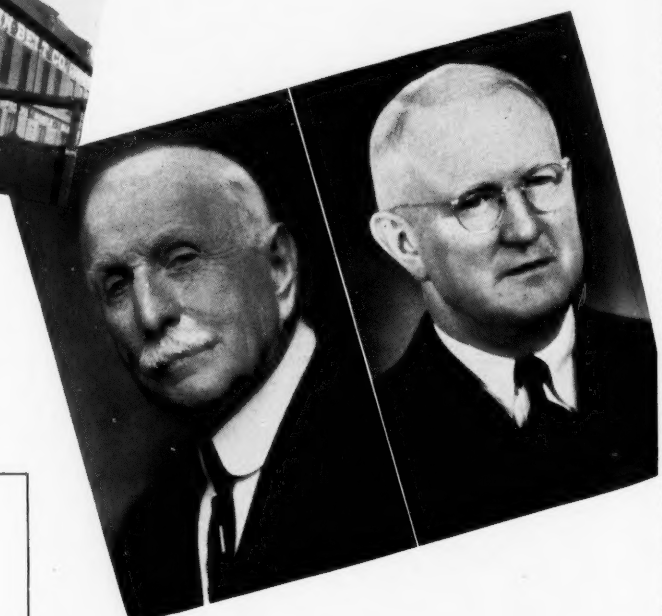


50th Anniversary Celebrated

By Chain Belt Co., Milwaukee

Sept. 9th, 1941 marked 50 years of progress and achievement for the Chain Belt Co., Milwaukee, Wis. Through consistent research and development work and the production of new products the company has extended both markets and lines. There is hardly an industry with anything to be handled that cannot use some product made by Chain Belt. At the left is an airplane view of the present plant. Below is the frame structure used from 1892 to 1902 for the offices and shop of the company. (Note the hitching post at edge of sidewalk.)

Below, C. W. Levalley, founder and first president of the company, and J. C. Merwin, present president.



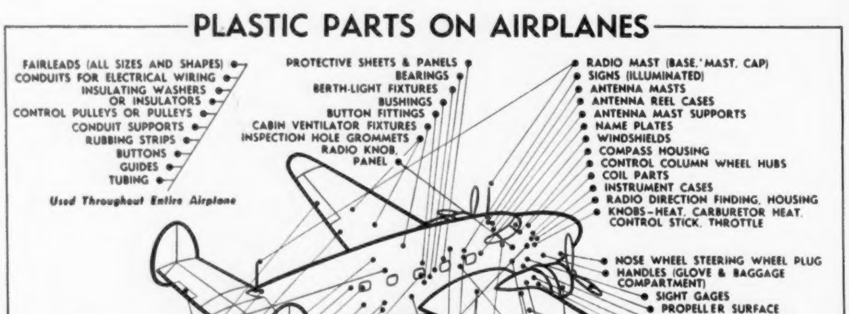
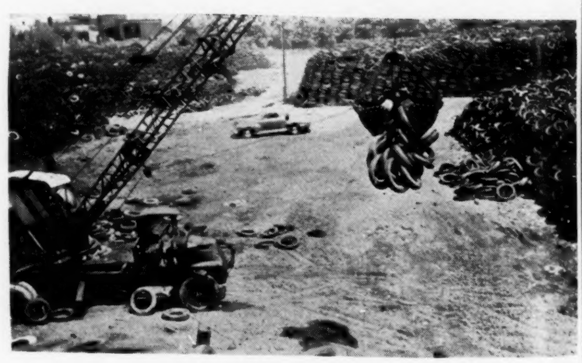


CHART — COURTESY OF E. I. DU PONT DE NEMOURS & CO. (INC.)

Du Pont has released this diagram showing the parts on modern airplanes which are made of plastics. The new acrylic resins and cellulosic plastics are used for these parts. These constitute permanent improvements to modern aircraft and are not just substitutes to replace temporarily scarce materials.



Above, a scene at the rubber reclamation plant of U. S. Rubber Co.'s Naugatuck Chemical plant at Naugatuck, Conn. Owen buckets of the rehandling type are used on mobile truck cranes to pick up the old rubber tires.

SHARPLES
MONOETHYLAMINE

SPECIFICATIONS
(70% Aqueous Solution)

Color	Water-white
Sp. Gr. at 20°/20°C.	0.79-0.80
Flash Point	Below 0°F.
Water Insoluble	None
Monoethylamine Content	At least 70%
Lbs. per Gallon	6.63 lbs.

PROPERTIES
(Literature Values for pure Monoethylamine)

Boiling Point	16.6°C.
Sp. Gr. at 15°/15°C.	0.689
Melting Point	-80.6°C.
Heat of Vaporization at 15°C.	14.57 cal./gm.
Heat of Combustion:	
Gas	9157 cal./gm.
Liquid	9058 cal./gm.
Heat of Solution in H_2O at 19°C.	6330 cal. per mol of solute at infinite dilution
Critical Temperature	183.2°C.
Dissociation Constant at 25°C.	5.6×10^{-4}

SHARPLES TRADE MARK CHEMICALS

Monoethylamine is interesting as a raw material in the manufacture of dyestuff intermediates, wetting agents and a number of other alkylated nitrogen compounds.

In view of the present low prices on Monoethylamine, it is suggested that former investigations which involved its use be reviewed. Conclusions previously formed may now be changed.

Anhydrous Monoethylamine can be made available whenever circumstances warrant, but unless water is objectionable for specific applications, it is more economical to use the solution which is shipped in nonreturnable drums.

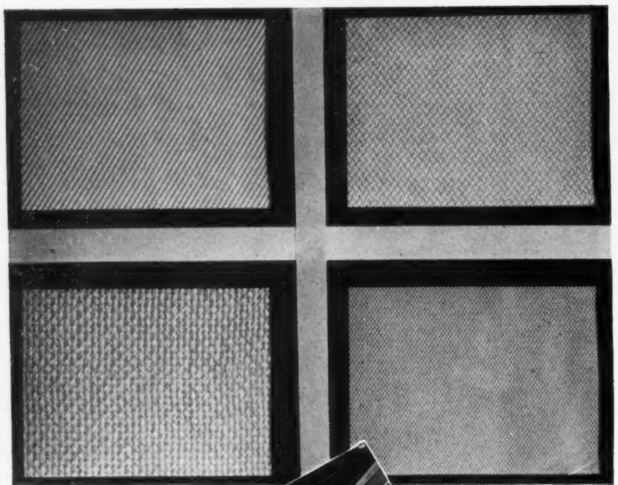
A complete price schedule will be sent on request. Also ask for a copy of the 12th Edition of "Sharples Synthetic Organic Chemicals" describing many other interesting products.

SHARPLES CHEMICALS Inc.

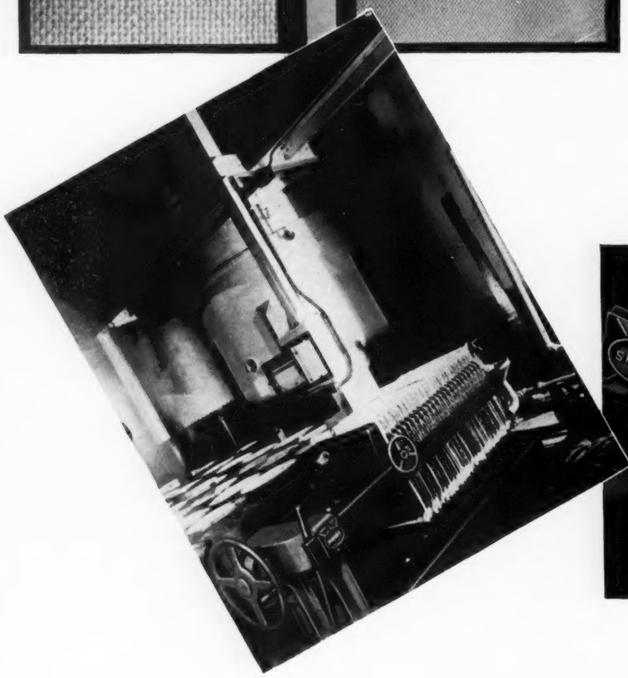
PHILADELPHIA CHICAGO NEW YORK

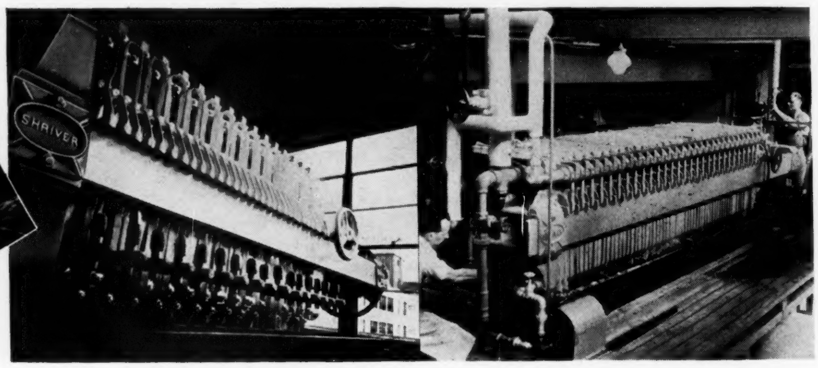
ADVERTISING PAGES REMOVED

What's New Here and There In the Chemical Industry

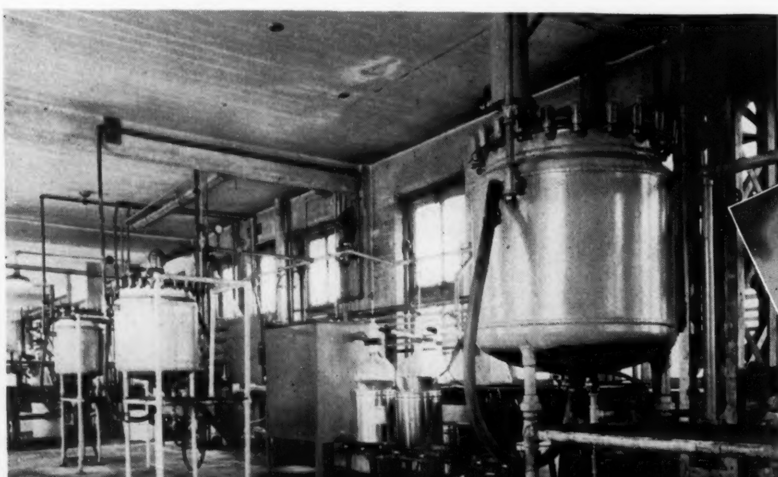


Vinyon for filter presses: **This group of photos submitted by Wellington Sears Co. shows the use of vinyon fibre fabric in the filter septum of presses in T. Shriver & Co.-equipped plants. Upper left photo shows several constructions of vinyon filter fabric normally used for filtration purposes. Below that, a filter press for dry colors. Directly below, large open delivery wood filter press in a fine chemical plant and washing-type filter press, steam and hot water jacketed for multiple filtration and processing of today's pharmaceuticals.**





Below, part of the newly modernized and enlarged Paul-Lewis Laboratories, Inc., Milwaukee, specialists in development and manufacture of biological, organic and enzymatic products. Recent additions in personnel and equipment have doubled capacity of the laboratory.



Above, first large scale application of bactericidal ultraviolet to air conditioning at Hillside, N. J., plant of Bristol-Meyers. Air passing through the ducts is rendered 95% free of air-borne bacteria by 104 Westinghouse Sterilamps.

NEWS OF THE MONTH

GENERAL

A. C. S. Convention

FIVE thousand or more chemists and industrialists gathered at Atlantic City, N. J., Sept. 8-12 for the 102d meeting of the American Chemical Society. The five-day program included sessions of the society's 18 professional divisions in which 600 papers and addresses were presented. Chemistry's contributions to industry, public health and other fields vital to national defense were included in the reports.

Leaders in the rubber industry participated in a symposium on "Rubber for Defense." Other symposia dealt with "The Chemistry of Aging," "New Analytical Tools for Biological and Food Research," "Physicochemical Methods in Protein Chemistry," "Progress in High Polymer Plastics," "Phosphates," "Professional Training of Chemists or Chemical Engineers," "Unit Processes in Industry," "Electrical Insulation Materials," and "Magnetism and Molecular Structure."

Divisional sessions were devoted to petroleum, agriculture and food, analytical and micro chemistry, proteins, vitamins, cellulose, chemical education, colloids, fertilizers, gas and fuel, industry and engineering, medicine, paint, varnish and plastics, and water, sewage and sanitation. Ninety-five papers were given by the division of Physical and Inorganic Chemistry.

Professor William Lloyd Evans of Ohio State University, president of the Society, delivered the presidential address Wednesday afternoon at a joint meeting of the Division of Organic Chemistry and related divisions. Major General William N. Porter, Chief of the U. S. Chemical Warfare Service, addressed a dinner meeting Wednesday evening.

Prizes were awarded and papers explaining new tools of chemistry were read at a general meeting opening the convention Monday afternoon. The Priestley Medal, highest honor bestowed by the American Chemical Society, was presented to Dr. Thomas Midgley, vice-president of the Ethyl Gasoline Corp. for outstanding achievement in chemical science. Dr. Midgley discovered tetraethyl lead as an antiknock agent for gasoline and is known for his work on refrigerants used in air conditioning.

The $1,000 Prize in Pure Chemistry, given annually for outstanding research in pure chemistry by a man or woman less than 36 years old, went to Dr. Karl A. Folkers, assistant director of research in the Merck Laboratories, Rahway, N. J., in recognition of his investigations in the field of organic chemistry.

Dr. H. V. Churchill, chief chemist of the Aluminum Company of America, spoke on "Industrial Spectrochemical Analysis." Dr. B. L. Clarke of the Bell Telephone Laboratories gave a demonstration of "The Electrographic Method of Analysis," and Dr. V. K. Zworykin and James Hillier of the R.C.A. Manufacturing Company describe "Applications of the Electron Microscope."

Aging, called the nation's most urgent medical problem, was discussed Tuesday afternoon at a symposium sponsored by the Division of Biological Chemistry, Professor Anton J. Carlson of the University of Chicago presiding.

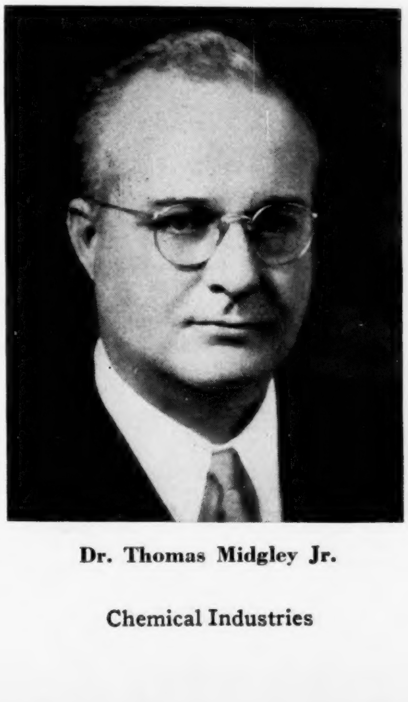
Rubber Symposium

Government officials and industrialists joined in the discussion of rubber for defense in a symposium to be held on Thursday afternoon by the Division of Rubber Chemistry. Roscoe H. Gerke of the United States Rubber Company Laboratories, Passaic, N. J., chairman of the Division, presided.

Forty-nine chemists reported research on vitamins at a joint meeting of the Divisions of Agricultural and Food, Biological, and Medicinal Chemistry held on Thursday.

Morning and afternoon sessions of the Divisions of Medicinal Chemistry on Wednesday featured reports on compounds related to sulfanilamide; studies in chemotherapy; pharmacological interactions of cobra venom and thiamin; a chemical and immunological study of protein fractions separated from ragweed pollen, and a study of the influence of intravenous phosphates on the concentration of blood lead.

Awarded Highest Honor



Dr. Thomas Midgley Jr.

Progress in high polymer plastics was the subject of a symposium on Wednesday morning and afternoon under the direction of the Division of Paint, Varnish, and Plastics Chemistry.

Presented before the division on Tuesday were reports on a new all-glass mill, the discovery of a rust-inhibitive pigment, the nature and constitution of shellac, apparatus and procedure for the quantitative thinning of hot varnishes, and the relationship of paint properties to surface areas of commercial carbon blacks.

A method of producing oil from whole cotton on a commercial scale was described before the Division of Cellulose Chemistry on Thursday afternoon.

Water supply for the Army during field operations, and the determination of small amounts of copper in water and sewage were among the fifteen topics discussed Wednesday morning and afternoon by the Division of Water, Sewage, and Sanitation Chemistry.

New Oil Development

Results of a new laboratory method for evaluating the deterioration of a number of known types of lubricating oils, and the invention of a simple laboratory machine which simulates the essential factors leading to the corrosion of bearings were described in morning and afternoon meetings Thursday of the Division of Petroleum Chemistry.

The Division of Chemical Education completed a three-day program with an address by Dr. Per K. Frolich of Standard Oil Development Co., Elizabeth, N. J., on "Synthetic Rubber Coming of Age," a feature of the Tuesday morning session.

Following a divisional luncheon at which Dr. Marston T. Bogert, Professor Emeritus of Organic Chemistry at Columbia University spoke, a general session was held Tuesday afternoon in which defense training courses in chemistry, a mobile chemistry demonstration unit, and other developments in chemical education were described.

Nineteen papers were read at the history of chemistry sessions.

Many women chemists participated in the divisional meetings and in other events of the convention.

COMPANIES

Quaker Company Expands

Quaker Chemical Products Corp., Conshohocken, Pa., is expanding its storage and manufacturing facilities, increasing its floor space approximately 12,000 square feet with an expenditure of about $50,000. Additional facilities are necessary to meet increasing demands. New facilities are scheduled for completion by Nov. New stainless steel stills, condensers and other equipment are being installed for the manufacture of resins and esters.

New Allis-Chalmers Organ

First issue of a news-sheet devoted to defense production news has been published by the Allis-Chalmers Mfg. Co. Called "Defense Production News," it will represent a monthly report stressing the importance of this company and its 1600 products in defense.

Harshaw Gets New Plant

Harshaw Chemical Co., Cleveland, has acquired the Los Angeles plant of the Menardi Metals Co., El Segundo, Calif., maker of antimony products and mercury.

Celluloid-Celanese Merger

Stockholders finally have approved the merger of Celluloid Corp. into the Celanese Corp. of America. Completion of merger awaits disposition of restraining orders.

Awards Service Emblems

In recognition of continuous service in the employ of the company for 10 and 20 years, Farrel-Birmingham Co., Inc., Ansonia, Conn., and Buffalo, N. Y., recently awarded service emblems to 577 employees who have completed either of those terms of service.

Consolidates Offices

Michigan Alkali Co. has consolidated its general sales and executive offices in the Ford Building, Detroit. Eastern branch office is maintained at 60 East 42d St., N. Y. City.

In New Locations

General offices of International Agricultural Corp., Union Potash & Chemical Corp., Phosphate Recovery Corp. and Kyanite Products Corp. are now located at 20 North Wacker Drive, Chicago.

The Foxboro Co., Foxboro, Mass., has moved its Cincinnati office to 607 American Building, Walnut St.. and Central Parkway.

All metal and molded caps and sealing equipment formerly produced at the Anchor Hocking Glass Corp.'s Closure Division Plant at Long Island City, N. Y., are now being produced at the Company's Connellsville, Pa. plant.

Packaging Clinic

A clinic on packaging conducted by PAC, sponsored by the General Printing Ink Corp., will be held Oct. 15 in the N. Y. Trade School auditorium at 312 E. 67 st., N. Y. City.

ASSOCIATIONS

Exposition Dec. 1-6

Eighteenth Exposition of Chemical Industries, coming to Grand Central Palace, N. Y. City, Dec. 1-6, will be the largest Chemical Exposition in 12 years. Applications are still being received from prospective exhibitors, although practically all the available space was allotted more than a month ago.

Problems of national defense will be the keynote, but underlying this theme will be a large amount of evidence pointing out the nation's strategic advance toward self-sufficiency.

Drug and Chemical Meeting

Drug, Chemical and Allied Trades Section of the N. Y. Board of Trade is holding its sixth annual fall meeting and golf tournament Oct. 24 and 25 at the Skytop Club, Skytop, Pa. Cocktail party Thursday night (Oct. 23) will be the informal opening. Golf tournament is scheduled for Friday and Saturday and a business meeting will be held Friday afternoon. Ladies are invited and special events will be provided for them. Registration fee is $7.50.

Textile Chemists Meeting

Annual meeting and convention of the American Association of Textile Chemists and Colorists will be held at The Carolina, Pinehurst, N. C., Oct. 31 to Nov. 1, under the auspices of the Piedmont section. Golf and tennis tournaments are scheduled features of the sports program plus a skeet shooting contest. Reservations and entrance applications are being made.

Chicago Rubber Group to Meet

Chicago Rubber Group meeting Oct. 10 at the Congress Hotel, Chicago, is expected to be the largest in the group's history. Andrew H. Hale, Farrel Birmingham Co., will show two motion pictures, one depicting the mill room of the future and the other a complete tour through the Ford tire plant. As an added feature, the group has arranged for a block of tickets to the Northwestern-Wisconsin football game, Saturday, Oct. 11, for which reservations are now being made.

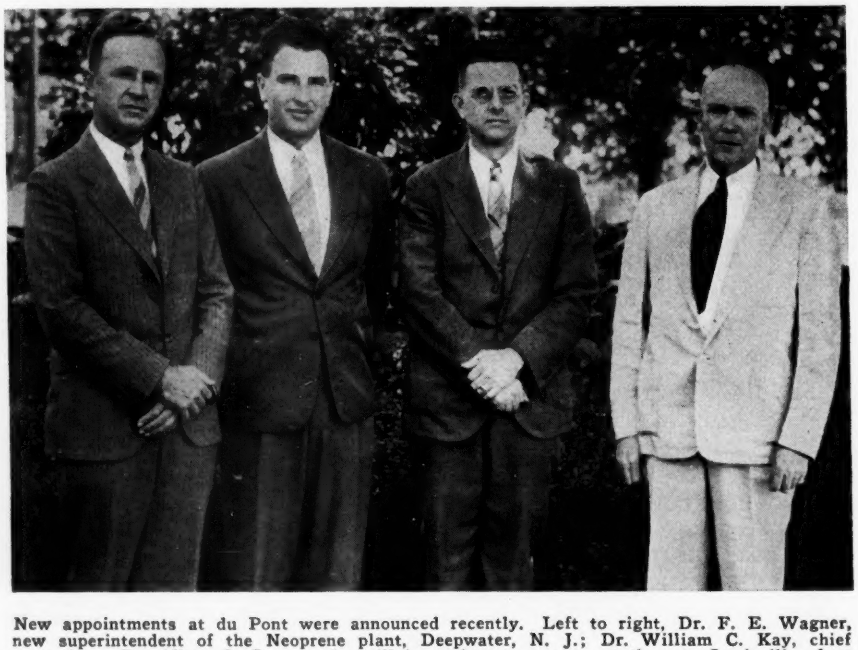
Wood Chemical Inst. Moves

Wood Chemical Institute, Inc., moved Sept. 1, from Washington, D. C., to Terminal Building, Bradford, Pa. J. A. McCormack has been elected Secretary-Treasurer, to succeed Dr. M. H. Haertel, resigned, who will maintain his address at the Albee Building, Washington, D. C.

Improve Olive Drab

American Association of Textile Chemists and Colorists has been asked to co-

Du Pont Executives Who Go to New Posts



New appointments at du Pont were announced recently. Left to right, Dr. F. E. Wagner, new superintendent of the Neoprene plant, Deepwater, N. J.; Dr. William C. Kay, chief supervisor; Dr. Albert S. Carter, who will be assistant manager at the new Louisville plant and E. W. Thompson, new manager at Louisville.

operate with the government in an investigation aimed at the improvement of woolen and worsted olive drab uniform fabrics with respect to color fastness. A committee has been appointed for this purpose.

EDUCATION

University of Alabama, Tuscaloosa, is offering new courses in its Fall Engineering Science Management Defense Training Program. Tuition and registration for these courses are free. Included in the program are: Chemistry of Powder and Explosives, Chemistry of Organic Synthesis, Production Supervision, Elementary Engineering Chemistry, Practical Application of Metallurgical Principles in the Iron and Steel Industry, Basic Accounting, and Radio Technology. Both Part A and B of Chemistry of Powder and Explosives will be offered Sept. 15.

A series of lectures on current trends in the American chemical industry will be presented by technologic specialists of Mellon Institute of Industrial Research during 1941-1942. These discourses, which will be delivered on alternate Thursdays, in the fourth period (11.30 A. M.—12:30 P. M.), throughout both semesters, in the auditorium of the Institute, will be open to all students of industrial chemistry and chemical engineering in the University of Pittsburgh, as well as to the Institute's members.

University Extension of Columbia University announces courses for the Winter Session of 1941-1942 in Rayon and Spun Rayon manufacture, textile design, textile chemistry, cotton manufacture, woolen and worsted manufacture, identification, analysis and testing, materials or merchandising—textiles and non-textiles.

New York University has scheduled a series of 15 weekly lectures on modern metals and plastics to begin September 23. In these lectures experts will discuss ways in which the more available materials may be substituted for others which have become more difficult to obtain.

Fellowship awards totalling $40,000 to 10 engineering school graduates will be offered for 1941-42 by the Institute of Gas Technology at Illinois Institute of Technology.

PERSONNEL

Back at Work

Ralph M. Neumann, general sales manager, N. J. Zinc Sales Co., has recuperated from pneumonia and is back at his desk.

Fred Neuberg, Warner Chemical Co., is now back at his desk after a serious illness which kept him in convalescence for several months.

Dr. John Campbell, technical director of International Paper since 1929, has joined Reynolds Metal Co., Richmond, Va., where he will be in charge of the plant efficiency department. **John J. Rusk** is now with the sales department of Neuberg Chemical Corp., N. Y. City.

F. C. Baker has been elected president of the American Potash & Chemical Corp. . . . Other officers elected are: **Peter Colefax,** vice-president, **R. W. Mumford,** vice-president and consulting engineer; **W. J. Murphy,** vice-president in charge of sales . . . **H. S. Emlaw,** retiring president, will continue as a director and member of the executive committee.

Alden B. Dow and **M. E. Putnam** have been elected directors of the Dow Chemical Co. succeeding **James Pardee** and **G. E. Collings,** resigned, who have been made emeritus chairman and emeritus vice-president, respectively . . . **Dr. Willard H. Dow** was reelected president and general manager of the company and chairman of the board.

Donald B. Stewart has been named manager of the general chemical laboratories of B. F. Goodrich Co., succeeding **Dr. Victor E. Wellman,** who has been appointed technical assistant in the general factory administrative department . . . **Adam L. Wesner** has joined the technical staff of Battelle Memorial Institute, Columbus, O. . . . **Andrew W. Liger** has joined the research staff of

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the institute . . . **Paul T. Talbott,** ceramic engineer, has joined the research staff of the institute.

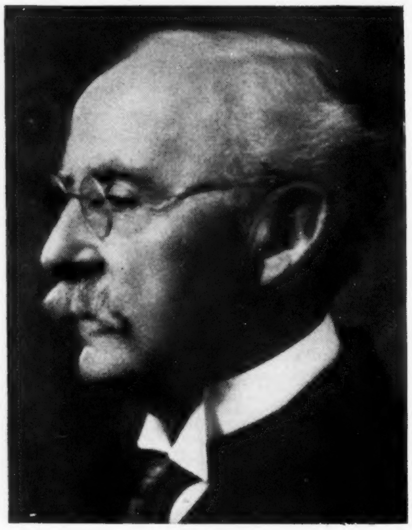
Walter M. Clark, sales manager, Murale Co., Inc., Staten Island, has been named to succeed **Carl Iddings** who resigned recently as general manager . . . **Samuel A. Stubbs** has joined the selling force of Atlas Color & Chemical Co. . . . **William K. Cusick** is now in charge of engineering and sales work for Irco Zinc Coat division of International Rustproof Corp., Cleveland, O.

Boyer Heads OPACS Section

John W. Boyer, formerly associated with Mathieson, Monsanto and Calco and more recently retired to his farm in Virginia, has been appointed to head the alkali and chlorine section of OPACS in Washington.

OBITUARIES

August Eimer



August Eimer

August Eimer, former president of Eimer & Amend and a charter member of the New York Chemists' Club, died Aug. 28 at his home in Port Chester, N. Y. He was 87 years old. One of the pioneers in the chrome steel and calcium carbide industries, he had retired 10 years ago.

Brian S. Brown

Major Brian S. Brown, 59, president of the Georgia Rosin Products Co., died August 30 at his home in Savannah, Ga.

Fred E. Weiss

Fred E. Weiss, director and vice-president, Charles H. Phillips Chemical Co., Glenbrook, Conn., died Aug. 29 at the age of 66.

Daniel D. Jackson

Professor Daniel D. Jackson, head of the department of chemical engineering of Columbia University, since 1918 and an authority on water supply and sanitation problems, died Sept. 1 at the age of 71.

Homer S. Snow

Homer S. Snow, 69, vice-president and traffic manager, American Zinc, Lead & Smelting Co., died Aug. 9.

Walter H. Newton

Walter H. Newton, ex-Congressman and former secretary to President Hoover, died at his home in Minneapolis Aug. 10 at the age of 56. He was always interested in the non-beverage uses of chemical alcohol and cooperated with arts, sciences and industries in that behalf.

CONSTRUCTION

New Ammonia Plant

Commercial Solvents Corp., N. Y. City, has been awarded a War Department contract for the construction of a $9,250,000 anhydrous ammonia plant at Sterlington, La.

Chlorine at Magnesium Plant

Basic Refractories, Inc., which is to operate three plants built by the Defense Plant Corp. in the $63,000,000 magnesium project in Nevada, will produce chlorine at one of the plants using extensive dry salt or brine deposits from the region.

Ammonium Nitrate Plant

Overtures have been made toward purchasing land north of Riverton, Kan., for the site of the governments new 17-million dollar ammonium nitrate plant. Construction will begin shortly.

Keystone Carbon Addition

Keystone Carbon Co. recently completed a large addition to its factory in Saint Marys, Pa. The Company has also laid the foundation for another large plant addition which will house new equipment for making negative temperature coefficient resistors.

Hercules Ammonia Plant

Hercules Powder Co. plans this month to begin construction on a $17,000,000 plant in the Middle West for the manufacture of ammonia for the U. S. Ordnance Department. Location will be announced soon.

ALCOA Construction

Aluminum Co. of America has completed a contract with Defense Plant Corp. for the construction and operation of an alumina plant in Arkansas with an annual capacity of 400,000,000 pounds, and for the construction and operation of three aluminum smelting plants, one at Massena, N. Y., with an annual capacity of 150,000,000 pounds, another in the Portland-Oregon district with an annual ca-

At Rumford Chemical's 82d Convention

Rumford Chemical Works 82nd annual Convention held recently brought to light an impersonation of Count Rumford, the company's patron saint, by Theodore Sweet, New England Sales Manager. The horse-drawn coach was once used by George Washington. Left to right are: George W. Penny, Jr., advertising manager; Raymond Gaylord, sales manager; Sweet; and A. E. Marshall, president.

pacity of 90,000,000 pounds, and a third in Arkansas with an annual capacity of 100,000,000 pounds.

Johns-Manville Plant

Johns-Manville Corp. has completed a contract with the War Department to proceed at once with the construction and operation of a $27,000,000 shell-loading plant, near Parsons, Kan.

Sherwin-Williams Gets Government Plant

Plans have been completed by the Sherwin-Williams Co., Cleveland, O., for construction, management and operation of a government bomb and shell loading plant known as Illinois Ordnance Works, to be built on Crab Orchard Lake, Marion, Ill.

Basic Magnesium Plants

Basic Magnesium of Cleveland, Inc., has signed a $63,000,000 government contract for the erection of plants to make metallic magnesium and other magnesium products vitally needed for war planes. Plants will be constructed in Mead, Gabbs and Las Vegas, Nev. They will have a gross capacity of 56,000 tons a year.

Dow Ammonia Plant

Dow Chemical Co. will build a plant at Chute, Tex,, for the manufacture of synthetic ammonia from natural gas. The new industrial plant, to cost about $11,000,000, will be financed by and operated under the supervision of the Defense Plant Corp. (Chute is near Freeport, Tex.)

Borne-Scrymser Builds

Construction is under way on an addition to the Elizabeth, N. J., plant of Borne Scrymser Co. Executive and sales forces will be transferred from the N. Y. City office to the new building upon completion.

Du Pont Powder Plant

E. I. du Pont de Nemours & Co., Inc., will operate a $51,000,000 government powder plant to be constructed in the Choteau-Pryor area near Tulsa, Okla., government sources have revealed.

TNT Production Begins

Production of TNT will begin this month at the $48,000,000 Kankakee Ordnance Works, Joliet, Ill., the largest high explosives manufacturing plant in the U. S. The rapid pace of construction has made it possible to schedule commencement of acid manufacture for Sept. 15 and operation of the first TNT line by Sept. 22.

Maltbie Building

Maltbie Chemical Co., Newark, N. J., will construct a $35,000 plant near Morristown, N. J., as part of its expansion program.

General Expanding

General Chemical Co., Claymont, Del., is planning expansion moves to cost around $1,000,000. Plans include taking over the old National Aniline Co. plant in Marcus Hook, remodeling some buildings, re-building others.

New Aridye Construction

Aridye Corp., Fairlawn, N. J., is expanding its plant in Rock Hill, S. C. Additions being built will triple warehouse space and double laboratory facilities.

Joliet Plant Ahead

Bomb and shell loading which began recently at the $38,000,000 Elwood Ordnance Plant, Joliet, Ill., is now 60 days ahead of schedule, the War Department announced this month. Building construction work began there Nov. 18, 1940.

Naugatuck Plant Begun

U. S. Rubber Co. recently broke ground in Naugatuck, Conn., for a 10,000-ton-a-year synthetic rubber plant being built under an agreement of lease between the rubber company and the Defense Plant Corp.

In New Locations

Clark Bros. Co., Inc., Olean, N. Y., has announced the opening of a new West Coast office, which will be in charge of A. K. Hegeman. The new sales office and warehouse will be located at the plant of the Pacific Pump Works, Huntington Park, Calif.

Wheelco Instruments Co., Chicago, has moved to a new location, in its own building, Harrison and Peoria streets. Increased business necessitated the move.

Baldwin Carbon Co. has established headquarters at 317 Halsey St., Newark, N. J.

All for Defense

A silhouette map of the United States bearing the words "Paint Protects America" is the new emblem-slogan emphasizing the paint industry's all-out effort for U. S. defense cooperation.

The significance of undertaking a larger share of defense orders is analysed in "Defense Contracts—Your Defense," an article appearing in the latest issue of "Witcombings," sent to executives in the chemical-using industries by Wishnick-Tumpeer, Inc., N. Y. City.

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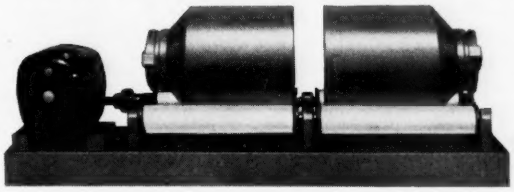

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Markets in Review

Heavy Chemicals — Fine Chemicals — Coal Tar Chemicals — Raw Materials — Agricultural Chemicals — Pigments and Solvents

By Paul B. Slawter, Jr., Market Editor

IN spite of the fact that practically the only thing to report about the chemical markets is that everything is "tight, short and extremely hard to get," this really is a wonderful period for any market analyst with a sense of humor. The things that are going on in the realms of business, industry and government these days would fill a Joe Miller Joke Book. Is there a gasoline emergency in the East or isn't there? What's next on priorities? What else on export control? What about non-defense industries that can't get materials? How *do* you get government business, anyhow? Are we having price control or aren't we? Which has priority, OPM, OPACS, SPAB, LH or FDR? Do the Army and Navy really need the seemingly excessive supplies ordered from industry posthaste while other orders are placed in the background? Is it true that SPAB will make a survey shortly of manufacturers' materials inventories?

About the only thing positive this department has to report in general is that the American people at the end of 1941 will be about 20 billion dollars richer than they were in 1938 which is about two billion dollars richer than 1929. Though the growing sacrifices called for by the defense program will cause dislocations to some industries and cause some unemployment, the year as a whole will bring a level of income which you'll describe one day to your grand-children as "prosperity."

Some relief was given the shipping problem when 80 German, Italian and Danish cargo ships immobilized in Latin American ports were released recently to operate in Western Hemisphere routes. More ships are needed for Trans-Pacific routes and Africa. Exports to Britain in the first half of 1941 were 74% greater than the first six months of a year ago. Exports to Japan dropped 50% in the same period. New freight rates under the Ship Warrant Bill are being worked on by the Maritime Commission. Railroads face defense traffic jams this Fall; they are short about 130,000 freight cars for the load.

On the labor front, the Trona strike seems to be settled. N. A. M. has assailed U. S. labor policy and called for a "bill of rights" for industry. The House last month rejected a committee's proposal to eliminate House amendments to the Property Seizure Bill permitting the President to seize munitions or machinery and supplies with which to make arms. The Representatives want the bill with amendments or else.

Workers in the Priorities Division, OPM, were busy little bees last month as the list of chemicals under full priority control grew and grew. As you might have expected the list looks like it will soon be all-inclusive so watch for anything. New chemicals to be distributed according to defense needs (A-10 rating) are tricresyl and triphenyl phosphates; phenols and phosphorous oxychloride. Under mandatory priority control now are: chlorine, formaldehyde, paraformaldehyde, hexamethylenetetramine, chlorinated hydrocarbon refrigerants, ethyl alcohol and related compounds, methyl alcohol, potassium perchlorate, potassium permanganate, toluene. Priority problems, according to Donald M. Nelson, will now be handled within 48 hours under the division's new system. Other high spots of priority control and price ceilings: vanadium is now under full priority control; lead priorities are imminent; cotton linters are on the list; chromium manufacturers must accept all defense and lease-lend orders first; an antimony producer withdrew a price increase through intervention of Leon Henderson; ceiling on pig tin is 52 cents for Grade A; fertilizer may soon be rationed; civilian use of synthetic resins and plastics made from formaldehyde restricted; steel in all forms is under full priority control; a ceiling price of 12 cents a pound for copper is in force; cadmium producers have agreed to price ceilings; control of tungsten in all forms is under new general preference order and civilian allocation program; newly-created priorities divisions in big industrial firms will help solve this great production problem.

Incidentally, the Army is pacing the current rapid expansion of the commercial plastics industry by adapting plastics wherever possible to national defense. Chief interests are: components of ammunition, airplane parts, communication parts, gas mask lenses, etc.

Important Price Changes

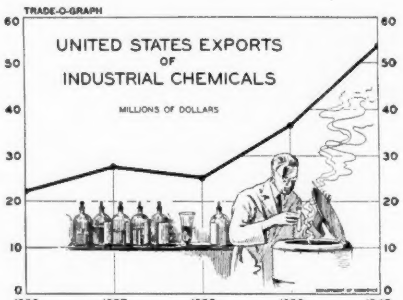
* ADVANCED

	July 31	Aug. 30
Casein, dom.	\$0.22½	.24
Arg.	.23½	.24
Codliver Oil, bbl.	80.00	85.00
Egg Albumen	1.55	1.60
Gum Arabic		
White sorts	.37	.40
Amber	.20	.21
Mangrove Bark, Ton	36.00	37.50
Mercury	190.00	195.00
Sodium Phosphate		
Di-basic	2.40	2.55
Tri-basic	2.55	2.70
Varnish Gums		
Copal, congo dark amber	.12⅜	.14
Dammar, Batavia		
E	.10	.13⅜
A-D	.15¼	.20½
Singapore No. 1	.16⅝	.24
No. 2	.12¼	.17⅞
Kauri Brown		
2B	.24	.25
Yacca Ord.	.03½	.06½

DECLINED

Carnauba Wax		
No. 3 N. C.	.79	.77
Chalky	.77	.76
Stramonium Leaves, lb.	.40	.32

Heavy Chemicals: A leading producer has advanced the price of chlorine 25 cents per 100 pounds in tanks and to a minimum of \$2.25 per 100 pounds for multiple tank cars. Dow Chemical advanced its price for carbon tetrachloride effective Sept. 1, on spot and Oct. 1 on contract. Increase makes price on drums, car lots, zone 1, 73 cents per gallon and adds seven cents a gallon to all other prices in 1, 2, 3. Zone 4 prices are unchanged. Much chlorine, incidentally, is going into degaussing ships (putting electric cables around them to counteract



magnetic mines). Producers, dealers and purchasers of acetic acid and acetic anhydride have been requested by OPA not to advance prices above the July 29, 1941 level. Lowered prices were posted for chlorosulphonic acid. Watch soda ash market; as aluminum plants come into production the additional tonnages required will be tremendous. Speaking of industrial changes, four of the large alkali producers shortly will become manufacturers of magnesium metal.

Paper manufacturers who have now been asked to cut chlorine requirements 40% are working on schedules for this purpose. Formaldehyde prices are under schedule setting a sliding scale ranging from 4.25 cents to 9.5 cents a pound. New export control schedules cover practically all industrial chemicals and also a number of chemical specialties and related products. Soap sales for the first six months of 1941 increased 26.3% over the same period in 1940. The 1941 copper shortage is expected to be around 500,000 tons. An acute shortage of copper sulfate continues. Hope is expressed that the new process recently announced will soon

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alleviate the condition. One leading producer of copper sulfate has withdrawn from the market. Major alkali producers, it is rumored, will supply virtually all British colonies; watch for its effect. Sulfuric acid and nitric acid may be in the news shortly; watch them. Fluorides are extremely scarce. Glass production is at record high levels. Oxalic acid in the resale market is far above listed prices, but then, what isn't these days? During the first half of 1941 consumption of phosphate rock jumped to 1,732,723 long tons. About 3,500,000 tons is expected to be the year-end figure, a record. Superphosphate shipments for the first five months increased 49% over 1940.

Fine Chemicals: Leon Henderson, still insisting that quoted prices for mercury (around $192 per flask) are much too high, says that there is every prospect that presently prices will be forced down. Mexican output is going to the government stockpile. Prices were advanced on tartaric acid, cream of tartar, rochelle salt, tartar emetic seidlitz mixture, establishing new highs. OPM issued a statement saying that prices on solvents prevailing July 29 were expected to be kept or lowered for the last quarter. Charges made for returnable carboys are being advanced all around. Export control, ever an increasing proposition, saw new OPM rulings on alcohols and glycols, amyl acetate, citric acid, ethyl ether, bromine, bromides and bromates, bismuth salts and compounds, cadmium salts and compounds, castor oil and many others. Glycerophosphate prices were advanced.

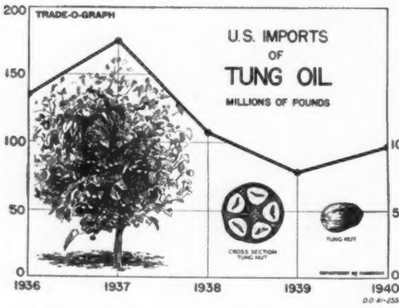
Current movement of ethyl alcohol into denaturing and direct defense and industry consumption threatens to cut further into supplies unless distillers are able to expand outputs. Stocks of ethyl, amounting to some 22,400,000 gallons in mid-1940, were lowered all the way to 7,100,000 gallons at the end of July this year as an indication of defense requirements.

Alcohol of every description is in demand and ruling at firm prices. The O. P. A. thus far has taken no action in imposing price ceilings upon alcohol, methanol and other industrial solvents, although some action along this line is expected.

Sidelight on the mercury situation: The U S. received 1,000 flasks recently from Lisbon, Portugal. If Spain should actively join the Axis, Great Britain could no longer buy mercury there and would come to this country for supplies. As usual, she'd get it. What would happen to domestic situation then? Mercury output here in June established a new high record with an output of 4,000 flasks.

Coal Tar Chemicals: Phenols and toluol, as you know, are now under full priority control. Remaining on the critical list are cresols, cresylic acid, naphthalene and phthalic anhydride. Tar acids are all sold up. Coaltar solvents are hard to get and so is creosote oil which has had tremendous use this year. Coking coal production from by-product ovens was up in July; benzol output declined; toluol gained. Output of creosote oil, crude and refined naphthalene rose in July also. An active buying movement has been the case in this market and is likely to continue to be for some time.

Raw Materials: Elimination of speculative practices which tend to disrupt the entire fats and oils field is OPM's decree this month with four corrective measures offered to keep the market in line. Crude scale wax market has been advancing in the face of heavy export demands. Production of paraffin wax in June was up. OPM has approved a plan to increase American egg drying capacity to provide dried eggs for Great Britain. Two new applications for cotton were announced recently; one is an extension of smokeless powder manufacture, the other a wax obtained from an unusual variety of green cotton. Shoe production in July was at its peak, 34% above production for the same month last year. The canning industry consumes vast quantities of chemical raw materials. Deletion of govern-



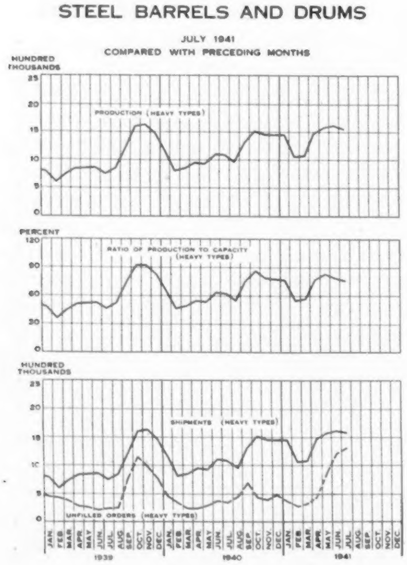
ment stocks of gum turpentine continues Rosin has been classed as an explosive commodity steaming up that industry no end because of shipping regulations which must be followed. (It was used in shrapnel in the World War as a binder). Exports of turpentine continue to decline. The Federal Surplus Commodity Corp. is opening bids from dealers in naval stores to fulfill Great Britain's request for 60,000 barrels of turpentine next year.

Fertilizer Materials: Superphosphate production for the 1940-41 fiscal year showed a 7% increase over the previous one. Expansion in the output of leguminous seed has been urged to offset a possible shortage in nitrogen for fertilizer use. Blood at Chicago, imported blood and tankage were all higher. Threatened shortage in available supply of superphosphate may be traced to difficulties in obtained sulfuric acid, essential to its manufacture. Nitrogenous material is scarce. Anhydrous ammonia, essential to the manufacture of explosives, is practically an orphan to the fertilizer industry. New plants, it is hoped, will help the situation some when they start to produce. Purchase of Chilean nitrates is being urged by OPACS as one method of keeping down prices on domestic sodium nitrate. Fertilizer tag sales in July were 7% over last year.

National Fertilizer Association points out that the new export control schedule (No. 17) effective August 29, includes additional fertilizers and fertilizer materials. All products under these classifications are now under export control except low-analysis potash salts.

Exports licenses are necessary to ship such materials out of the country. However, blanket licenses have been issued which permit the shipment of practically all fertilizers and fertilizer materials to Canada, Great Britain and the Philippines without individual licenses. Some of these products may be shipped to South and Central American countries and other nations specifically listed under blanket license.

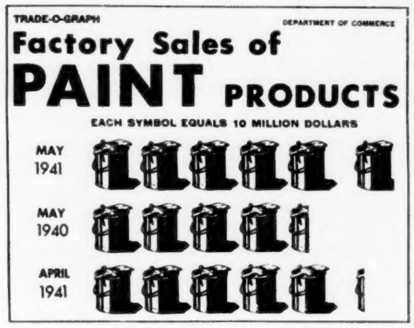
STEEL BARRELS AND DRUMS



Solvents: The distilling industry may be called upon to make alcohol for defense needs. This would mean a curtailment of whiskey production. The Commodity Credit Corp. has offered to make 20,000,000 bushels of corn available to the War Department for the production of alcohol to be used for munitions. Much alcohol is moving out to plants under the priority ruling effected recently for ethyl in defense industries. Even a 5,000,000 gallon increase in production of methanol this year has failed to satisfy demands for this product. OPA is contemplating a price ceiling for this and a number of other industrial solvents, among them, ethyl alcohol, acetone, acetic acid, acetic anhydride, methyl acetone, ethyl acetate, normal and secondary butyl acetate, dibutyl phthalate, isopropyl alcohol, normal and secondary butyl alcohols.

Paint Materials: Paint manufacturers do not think they can obtain colors and body materials enough to keep up the tremendous demand they have been working under this year. Linseed oil cannot continue to come to them in the quantities they have been taking they feel. Home construction, if it keeps up the way it has been going, will put the paint industry in a spot to supply the demand. Manufacture of white sidewall tires has been prohibited. This will save rubber and zinc oxide. Shellac prices have been advanced. Argentine casein is scarce and prices are at the highest levels ever. Future production prospects are not any too bright, either. Imports of varnish gums continue at high levels, but increases in price are expected. A paint wage minimum is expected soon. Zinc chromate (yellow) is now on the priorities critical list.

Outlook: Priorities and more priorities, price control and more price control, shortages and more shortages, and then . . . perhaps relief, perhaps not. That's the outlook from this periscope. Now that they have started to put chemicals on the priority list it won't be long before the situation approaches that now existing in metals, so use that list as your barometer.

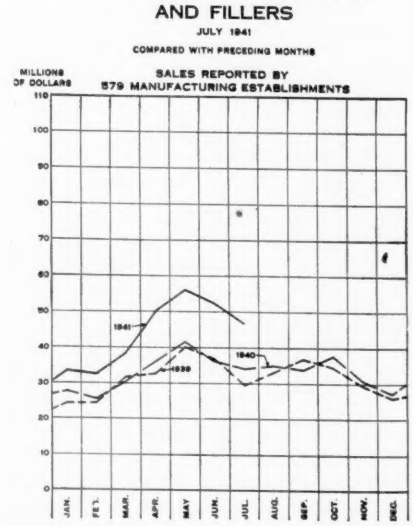


Price control, a somewhat messy situation now, probably will get worse but if they do it for one thing, why not for all? With the tremendous rise in national income it might be a good idea for some of the boys who can't do otherwise to look into the chemical specialties market.

Chemical Industry and consumers must look forward to more drastic and arbitrary handling of priorities at the hands of the newly created Supply Priorities and Allocations Board, and the Priorities Regulation 1 issued by O. P. M. The new seven-man agency (S. P. A. B.) has been endowed with the most sweeping powers ever given an executive Government group in either peace or war. Under the direction of S. P. A. B., it seems, the priorities director now has virtually complete and undisputed control over all business and manufacturing operations. The President's executive order creating the new priorities system (provision A) says in part:

"The Supply Priorities and Allocation Board shall: . . . Determine policies and make regulations governing allocations and priorities with respect to the procurement, production, transmission or transportation of materials, articles, power, fuel, and other commodities among military, economic defense, defense aid, civilian and other major demands of the total defense program."

PAINT, VARNISH, LACQUER, AND FILLERS



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U.S.I. CHEMICAL NEWS

September ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1941

Rivets are Frozen To Keep Them Soft Till Ready to Use

Solid Carbon Dioxide Employed To Maintain Low Temperatures

Refrigerated chests that keep rivets "fresh" and ready to use are a novel wrinkle in airplane construction. The rivets are of an aluminum alloy that stays soft at very low temperatures, but hardens and becomes unworkable at ordinary room temperatures. The rivets are kept in refrigerators using solid carbon dioxide as the chilling agent, and are transferred as needed to smaller refrigerated chests along the production lines. They are driven within a few minutes after being taken out of cold storage, and quickly attain their maximum strength as they warm up.

Solid carbon dioxide ("DRY-ICE") is manufactured and supplied by Pure Carbonic, Incorporated, an associated company of U.S.I.

Solid carbon dioxide keeps the rivets cold in small chests like this till ready to use.

Describes Zein Coatings For Paper and Cardboard

CLOSTER, N. J.—Zein coatings applied to paper, cardboard, and other porous materials can be made to retain their flexibility permanently by using two plasticizers, one compatible with zein, the other non-compatible.

This method of overcoming the tendency of zein films to become brittle when applied to porous bodies is suggested by an inventor here, who has won a patent on the method.

In general, the new coatings are described as consisting of zein, anhydrous ethanol, a mutual solvent for the zein and the anhydrous ethanol, a resinous substance, and the two plasticizers.

A typical formula is as follows:

	Parts by weight
Zein	100
Ester gum	50
Butyl tartrate	50
Butyl phthalate	25
Toluol	100
Anhydrous ethanol	200

A suggested method of application is to coat a sheet of paper previously covered with a nitrocellulose lacquer, allow the zein coating to dry slightly, and then transfer it to the article to be coated.

Novel Uses Revealed for U.S.I. Products in Petroleum Industry

New Applications in Purifying and Refining Involve Use of Ethanol, Acetone, Amyl Alcohol, Other Solvents and Chemicals

The solvents and chemicals produced by U.S.I. are rapidly branching out into new fields of utility in the petroleum industry. In the past, the chief application of U.S.I. products has been the use of acetone for dewaxing lubricating oils. Recent patents, however, reveal many new applications, several of which center around the refining of petroleum products, while others cover dewaxing processes that make use of other U.S.I. solvents.

Two of these new processes deal with the treatment of organic acids obtained by oxidizing hydrocarbons. The first process has for its aim the isolation of the various fractions resulting from the oxidation of the hydrocarbons by first separating them into two phases, one soluble, the other insoluble, in the unreacted hydrocarbons. The hydrocarbon-insoluble phase is extracted with a selective solvent such as ethanol or acetone, and then treated with sulfuric acid. Several of the resulting products are said to be suitable for use in resin manufacture.

Fatty Acids for Soaps

The second process is designed chiefly for the production of high-grade fatty acids suitable for use in soap manufacture or as rubber softeners. The oxidation products are saponified, and ethanol is added to avoid emulsions. The saponification products are treated with sulfuric acid, after removal of the ethanol, to liberate the acids.

Another recent patent describes a method for purifying the crude mahogany sulfonates obtained as by-products in the preparation of white oil. If the crude sulfonates are dissolved in amyl alcohol, and the solution repeatedly washed with water, a substantial part of the impurities will be removed, according to the patent. Other suitable solvents include butanol, ethyl acetate, and normal butyl acetate.

In the dewaxing of oils, a number of solvent mixtures are suggested in recent patents:

(*Continued on next page*)

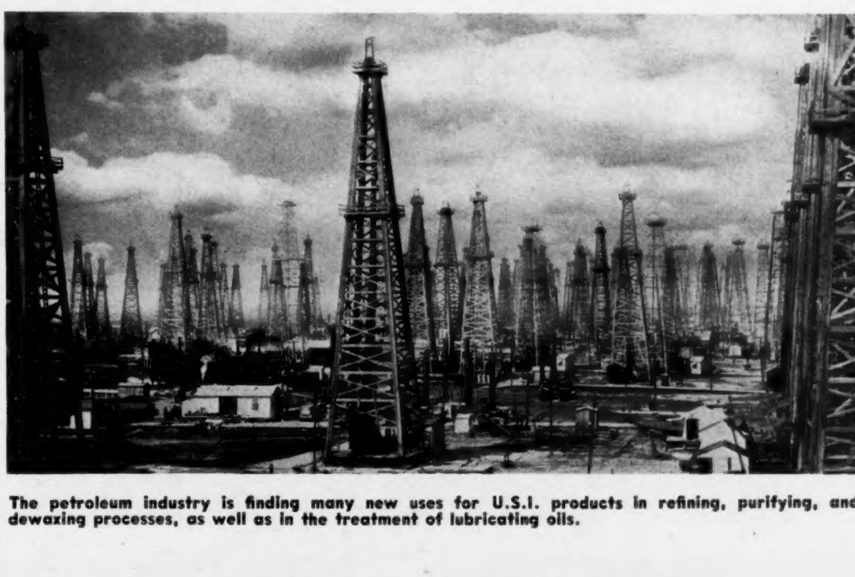
Succeed in Extraction of Alumina by Acid Process

LEONIA, N. J.—The problem of extracting alumina from aluminum ores by an acid process has been successfully solved by a novel technique involving the use of a selective solvent to remove the iron content, leaving the alumina pure enough for use in the production of metallic aluminum.

That is the claim made by inventors here and in New York, who have received a patent on their process. In the past, the inventors point out, successful application of acid processes to the extraction of alumina has been hampered by difficulties in keeping the iron content low enough, since the aluminum-containing ores to which acid processes are applicable usually contain iron.

Use of Selective Solvent

In the new process, the aluminum-containing ore is roasted and then treated with hydrochloric acid to give a concentrated aluminum chloride solution, which is contaminated with ferric chloride. An organic solvent, immiscible in water and having a preferential affinity for iron, is then added to the solution. The inventors suggest butyl acetate, ethyl acetate, or amyl alcohol. The liquids are allowed to settle, after which the ferric chloride will be found in the organic solvent phase. The aluminum chloride solution is evaporated, and the solid chloride is decomposed by heat, yielding aluminum oxide, containing as little as .006% ferric oxide.



The petroleum industry is finding many new uses for U.S.I. products in refining, purifying, and dewaxing processes, as well as in the treatment of lubricating oils.

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September ★ **U.S.I. CHEMICAL NEWS** ★ 1941

Viscosity of Polyvinyl Acetate Is Controlled by Type, Amount of Solvent

MOSCOW, U. S. S. R.—The viscosity of polyvinyl acetate can be varied over a wide range by changing the nature and amount of the organic solvent used as the medium in the polymerization process, it has been reported by research workers here.

The procedure was to polymerize vinyl acetate in a solvent with benzoyl peroxide as catalyst. With ethyl acetate as the solvent, and the amount of catalyst remaining constant, viscosities ranging from 8 to 58 centipoises were obtained by varying the amount of solvent. With ethanol as the solvent, the viscosities ranged from 2 to 14 centipoises.

New Petroleum Uses

(*Continued from previous page*)

amyl acetate and isopropyl acetate; ethyl lactate and secondary butyl alcohol; ethyl oxalate and secondary butyl alcohol. Ethyl oxalate has also been suggested as a corrosion inhibitor in lubricating oils compounded with metallic naphthenates. In another lubricating oil patent, small additions of methyl, ethyl, or butyl phthalate are described as substantially increasing the load-carrying capacity of the lubricants.

(Among the solvents and chemicals mentioned in this article, U.S.I.'s product list includes ethanol, acetone, amyl alcohol, butanol, ethyl acetate, normal butyl acetate, amyl acetate, isopropyl acetate, ethyl lactate, secondary butyl alcohol, ethyl oxalate, and methyl, ethyl, and butyl phthalates.)

Selective Solvents Separate Isomeric Compound Mixtures

THE HAGUE, Netherlands—Isomeric organic compounds can be readily separated from mixtures by the use of selective solvents, according to claims made in a U. S. Patent granted to inventors in this country.

The method consists in using a polar liquid as the first extracting solvent, and a less polar liquid as the second. The difference in polarity allows formation of two liquid phases.

Examples cited include the separation of paravanillin and orthovanillin by means of ethanol and gasoline; orthonitrophenol and paranitrophenol, also by ethanol and gasoline; of propane 1.1 dicarbonic acid and propane 1.3 dicarbonic acid by ethyl acetate and water.

Properties of Cotton Improved by Treatment

When cotton is treated with a mixture of benzol with ethanol or methanol, the wax coating of the fibers can be removed, it has been learned. The effect of the chemical treatment is said to increase the resilience of the cotton and produce a harsher texture. The resulting product resembles in properties cotton imported from Asia and Peru.

Describes New Composition For Safety Glass Sheets

ROCHESTER, N. Y.—Highly flexible, permanently transparent sheets for use in laminated safety glass can be formed by polyvinyl acetal resins by using a mixture of butyl phthalate and butyl sulfone as the plasticizer, it has been revealed in a patent granted to an inventor here.

When 40 or more parts of this mixture are used with 100 parts of the polyvinyl acetal resin, an unusual elasticizing effect is obtained. Sheets formed in this way have the property of stretching to a considerable extent under tension, and returning to their original dimensions when the tension is released, according to the inventor.

Percentages of the plasticizers used may range from a 70-30 mixture of butyl phthalate and butyl sulfone to a 30-70 mixture. The composition may be formed into sheets with the aid of a volatile solvent, such as acetone, or it may be extruded or molded.

Bentonite-Ethylene Spray Stimulates Bud Formation

HONOLULU, Hawaii—Formation and development of plant buds can be stimulated by treatment involving the use of bentonite and ethylene, it has been discovered by an inventor here, who has received a patent on the process. While described particularly in relation to pineapples, the process is applicable to other plants as well.

The treatment consists in spraying the plants with a mixture prepared by suspending the bentonite in water, and then saturating the suspension with ethylene. Small quantities of magnesium oxide or other materials may be added to increase the tendency of the bentonite to form a gel. Use of the bentonite appears to permit absorbing more of the ethylene.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A silver gray color, available in both lacquer enamel and baked finishes, is reported to simulate the color of aluminum bronze very closely. The lacquer enamel and the baked finishes are one-coat finishes. **(No. 490)**

U S I

An oil paint can be safely applied over damp plaster, brick, cement, and concrete, according to the manufacturer. It is said not to be affected by lime or alkali, and does not seal in the moisture. It can be applied over plaster one day old, it is claimed. **(No. 491)**

U S I

A new synthetic wax is soluble in cold alcohol and cold ethyl acetate, the maker reports. The wax is said to have interesting potentialities as an emulsifying agent, particularly in the presence of strong alkalis. **(No. 492)**

U S I

Porous metal in the form of sheets, discs, cylinders, cones, and special shapes is said to have many uses in filtering, diffusing, atomizing, flow control. Suggested applications include removal of unwanted substances from solvents, fuel and lubricating oils, and refrigerants; diffusion of gases into liquids; separation of a liquid from air; arresting flames in lines carrying inflammable fluids. **(No. 493)**

U S I

Protective aprons are described as being made of a new type of material that gives effective protection against acids, oils, and greases. It is said that the material is heat-resisting and will not burn. **(No. 494)**

U S I

Soluble cutting compounds can be easily prepared from a liquid concentrate previously used chiefly for degreasing, the manufacturer claims. The cutting compounds are made by adding light lubricating oil and petroleum distillate to the concentrate. Proportions can be adjusted to the needs of specific jobs, it is said. **(No. 495)**

U S I

A new protective coating is said to be especially designed to prevent corrosion or disintegration of metal parts exposed to gaseous atmospheres at elevated temperatures. It is applied as a liquid, and is reported to withstand temperatures up to 1,500° F. **(No. 496)**

U S I

Transparent gloves made from a synthetic rubber-like material are said to protect workers' hands from practically all oils and solvents. Gloves have high strength and good wearing qualities, and do not tarnish metal surfaces, according to the maker. **(No. 497)**

U S I

Bodying of oils can be carried out with the aid of a new product, it is reported. The material is also useful for the preparation of non-skinning varnishes which are extremely resistant to attack by gases. In addition, it is said to increase gloss and resistance to alkalis. **(No. 498)**

U S I

A novel marking ink can be applied to tin cans from a stamp pad. It is reported that the ink has an etching effect, and that it continues to harden and develop into the tin for several weeks after application. **(No. 499)**

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- Pure—190 proof, C.P. 96%, Absolute
- U.S.I. Denatured Alcohol Anti-freeze
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- Ethyl Oxalate

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- Amyl Propionate
- Butyl Propionate

OTHER ESTERS
- *Diatol
- Ethyl Carbonate
- Ethyl Chloroformate
- Ethyl Formate
- Ethyl Lactate

INTERMEDIATES
- Acetoacetanilide
- Acetoacet-ortho-anisidide
- Acetoacet-ortho-chloranilide
- Acetoacet-ortho-toluidide
- Acetoacet-para-chloranilide
- Ethyl Acetoacetate
- Ethyl Benzoylacetate
- Ethyl Sodium Oxalacetate

ETHERS
- Ethyl Ether
- Ethyl Ether Absolute—A.C.S.

OTHER PRODUCTS
- Acetone
- *BK-5
- Collodions
- *Curbay B-G
- *Curbay Binders
- *Curbay X (Powder)
- Derex
- Ethylene
- Ethylene Glycol
- *Indalone
- Methyl Acetone
- Nitrocellulose Solutions
- Potash, Agricultural
- Urethan
- *Vacatone

CALENDAR OF EVENTS

September

Sept. 16-19, Technical Association Pulp and Paper Industry, Fall Meeting, Ann Arbor, Mich.
Sept. 17-19, National Petroleum Assn., 39th Annual Meeting, Hotel Traymore, Atlantic City, N. J.
Sept. 18-19, American Water Works Association Meeting, of Rocky Mountain Section, Santa Fe, New Mexico.
Sept. 24-26, American Water Works Assoc. Meeting Michigan Section, Grand Rapids, Mich.
Sept. 25-26, Society of Automotive Engineers, National Tractor Meeting, Schroeder Hotel, Milwaukee, Wisc.
Sept. 29, National Wholesale Druggists' Association, Annual Convention, Greenbrier Hotel, White Sulphur Springs, W. Va.
Sept. 29-30, National Lubricating Grease Institute, Ninth Annual Meeting, Stevens Hotel, Chicago, Ill.
Sept. 29-Oct. 2, National Wholesale Druggists' Association, N. W. D. A. Convention, White Sulphur Springs, West Virginia.

October

Oct. 1-4, Electrochemical Society, Inc. Fall Meeting, Hotel Knickerbocker, Chicago, Ill.
Oct. 1-4, Electrochemical Society, Inc., Semi-Annual Meeting, Chicago, Ill.
Oct. 6-8, Annual National Foreign Trade Convention, Pennsylvania Hotel, New York, N. Y.
Oct. 6-8, National Electrical Contractors Association, Rice Hotel, Houston, Texas.
Oct. 6-10, The National Association of Retail Druggists, 43rd Annual Convention, Statler Hotel, Cleveland, O.
Oct. 6-10, National Safety Council, Inc., 30th National Safety Congress and Exposition, Stevens Hotel, Chicago, Ill.
Oct. 8-10, Porcelain Enamel Institute, Sixth Annual Forum, Ohio State University, Columbus, O.
Oct. 9-11, New York State Sewage Works Assoc. Fall Meeting, New York, N. Y.
Oct. 9-11, Texas Mid-Continent Oil & Gas Assn., 22nd Annual Meeting, Beaumont, Texas.
Oct. 12-15, The American Society of Mechanical Engineers, Fall Meeting, Louisville, Ky.

Personnel

John E. Caskey, formerly factory manager of Naugatuck Chemical Division of U. S. Rubber, has been made assistant general manager . . . **Phillip E. Rice** has been made factory manager . . . **Charles E. Wangeman** has been appointed head of the bureau of placements at Carnegie Institute of Technology . . . **G. S. Furman** has been made manager of the New York office of Merck & Co. He has been assistant manager of the office for the past four years and succeeds **Gustave Bayer** who retired July 1.

Recent additions to the research staff of Commercial Solvents Corp., Terre Haute, Ind., include **Jack W. Burns,** M.S., **Harold G. Johnson,** Ph.D., **Robert F. Taylor,** Ph.D., and **James M. Van Lanen,** Ph.D., recent graduates of the University of Wisconsin; **Richard J. Hickey,** Ph.D., and **Merrick W. Shepard,** B.S., Iowa State College; **P. C. Markunas,** Ph.D., University of Illinois, and **Frank J. Rudert,** Ph.D., Cornell University.

L. W. Mason has been appointed comptroller of Hercules Powder Co. succeeding **F. J. Kennerley** who will be assistant treasurer . . . **W. S. Harkins** was made assistant to Mason . . . **A. K. Hegeman** has been made West Coast manager of the new office and warehouse of Clark Bros. Co., Inc. . . . **Richard P. Swartz,** vice-president of Crown Can Co., Philadelphia, has been promoted to the post of assistant to the president.

R. W. Lahey

(*Continued from page* 345)

guarding the standard of quality from refinery to consumers of Quaker State products.

Steel for Containers

Arrangements by which manufacturers of steel drums and containers will be able to obtain enough steel to fill defense orders from the petroleum and chemical industries during the next two months while a permanent program is being worked out were announced recently by the Division of Purchases, Office of Production Management.

A committee representing the industry has had many meetings with OPM officials during recent weeks. This committee has been informed that the 54 manufacturers of steel drums should make out and submit Forms PD-1 for their requirements to meet orders for chemical and petroleum products during September and October on the basis of 2/3 of the normal rate. Their orders will then be eligible for A-5 priority ratings.

The drum manufacturers have found great difficulty in getting the sheet steel they need for the chemical and petroleum industry, and to a large extent the industry has been operating on its inventories. The issuance of A-5 ratings on a 2/3 basis covering September and October requirements is a temporary arrangement only. OPM statisticians are now tabulating information obtained through questionnaires which will show what percentage of the industry's output is used by the oil industry; what percentage is used for protective coatings and chemicals; and what percentage is used for food products.

When that information is fully tabulated, OPM officials will consult representatives of those industries to determine the extent to which materials other than steel could be used for the manufacture of drums and other containers. Once that has been done, it is hoped a permanent arrangement governing steel supplies for the steel drum industry can be made.

Washington

(*Continued from page* 284)

taxed at $1.50 per gallon, compared with $7 per gallon on beverage alcohol.

The past month has seen export restrictions further applied to chemicals and related products, except medicines and pharmaceuticals which became effective August 29.

During this period also, Leon Henderson imposed ceiling prices on formaldehyde to check alleged exploitation of civilian users by certain dealers who were reported to be charging as much as 47 cents per pound on a product at manufacturers' prices of 6 cents for comparable quantities. The maximum price established ranges from 4.25 to 9.5 cents a pound f.o.b. five leading shipping points, and based on the maximum price lists of outstanding manufacturers.

He also acted to halt reported speculative practices tending to disrupt the price structure in the fats and oils field by prohibiting purchases of these commodities for strictly speculative purposes and restricting certain other trade practices.

Chlorinated hydrocarbon refrigerants were placed under priority control to meet defense requirements, and a regulated allocation of freon refrigerant gases to users and manufacturers of civilian refrigeration and air condition equipment also was ordered by OPACS or OPM, according to jurisdiction, in recent days.

As this is written an order is being prepared fixing ceiling prices on industrial solvents and certain other chemicals and doubtless will be issued by the time this appears. Late in August a general preference order was promulgated by E. R. Stettinius, Jr., then directing priorities, to prohibit the sale of second-cut linters, or more than 20 per cent of mill-run linters for any purpose other than ultimate use in the chemical industry. This last action was taken to protect a supply of cotton linters essential in the manufacture of smokeless powder, plastics and acetate rayons.

Subsequent to its order relating to speculation in fats and oils OPACS was compelled to follow with a modifying explanation that nothing in the order applied to futures contracts, or is designed to prevent trading in futures contracts on fats, oils, cottonseed oil, or lard on any organized commodity exchange.

An interesting, if minor note in the reorganization of the various defense agencies just mentioned is that Donald M. Nelson, who now takes over priorities in place of Stettinius, began his career with Sears, Roebuck as chemical engineer. He is now executive vice president and member of the board of directors of that concern.

Heavy Chemicals, Coal-Tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

PRICES CURRENT

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.*

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1940 Average $1.20 - Jan. 1941 $1.16 - Aug. 1941 $1.04

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Acetaldehyde, drs, c-l, wks lb.	...	.11	...	.11	...	.11
Acetaldol, 55 gal drs wks lb. wks ....lb.	.12	.13	.11	.13	.11	.25
Acetamide, tech, lcl, kgs lb.	.28	.30	.28	.30	.28	.50
Acetanilid, tech, 150 lb bbls lb.	.29	.31	.29	.31	.27	.31
Acetic Anhydride, drs, f.o.b. wks, frt all'd ....lb.	.11½	.13	.10½	.13	.10½	.11½
Acetin, tech, drs ....lb.	...	.33	...	.33	...	.33
Acetone, tks, f.o.b. wks, frt all'd ....lb.	...	.07	.06	.07	.05	.06
drs, c-l, f.o.b. wks, frt all'd lb.	...	.08½	.07½	.08½	.06½	.07½
Acetyl chloride, 100 lb cbys lb	.55	.68	.55	.68	.55	.68
Acetic, 28%, 400 lb bbls, c-l, wks .... 100 lbs.	3.18	3.43	2.23	3.43	...	2.23
glacial, bbls, c-l, wks 100 lbs.	8.30	8.55	7.62	8.55	...	7.62
glacial, USP bbls, c-l, wks .... 100 lbs.	10.25	11.00	10.25	11.00	...	10.25
Acetic Acid Glacial, *Synthetic* 99.5%, cbys, cases, delv lb.	.0918	.10	.0843	.10	...	...
99.5%, 110-gal dr, delv lb.	.0843	.0868	.0843	.0918	...	...
USP XI, cases, cbys, delv ....lb.	...	.11	.1025	.11	...	...
USP XI, 110-gal drs, delv ....lb.	...	.10½	.10¼	.11	...	...
CP, cases, cbys, delv ...lb.	...	.14	.13½	.14	...	...
CP, 55-gal drs, delv ....lb.	...	.13½	.13¼	.13½	...	...
Acetylsalicylic, USP, 225 lb. bbls ....lb.	...	.45	...	.45	...	.45
Adipic, kgs, bbls ....lb.	...	.31	...	.31	.31	.72
Anthranilic, ref'd, bbls ...lb.	1.15	1.20	1.15	1.20	1.15	1.20
tech bbls ....lb.	...	.75	...	.75		.75
Ascorbic, bot ....oz.	1.85	2.10	1.85	2.10	2.25	3.00
Battery, cbys, wks ...100 lbs.	1.60	2.55	1.60	2.55	1.60	2.55
Benzoic, tech, 100 lb kgs lb.	.43	.47	.43	.47	.43	.47
USP, 100 lb kgs ....lb.	.54	.60	.54	.60	.54	.59
Boric, tech, gran, 80 tons, bulk-bgs, delv ......ton *a*	93.50	96.00	93.50	96.00	...	96.00
Broenner's, bbls ....lb.	...	1.11	...	1.11	...	1.11
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks lb.	...	.22	...	.22	...	.22
wks, lcl ....lb.	...	.23	...	.23	...	.23
tks, wks ....lb.	...	.21	...	.21	...	.21
Caproic, normal, drs .....lb.	.25	.30	.25	.35	.35	.40
Chicago, bbls ....lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs. wks ....lb.	.03½	...	.03½	.05	.03½	.05
Chromic, 99¾%, drs, delv lb.	.16¼	...	.15¼	.17¼	.15¼	.17¼
Citric, USP, crys, 230 lb bbls. ....lb. *b*	.20	.21	.20	.21	.20	.21½
anhyd, gran bbls .....lb. *b*	...	.23	...	.23	...	.23
Cleve's, 250 lb bbls ......lb.	...	.65	...	.65	...	.57
Cresylic, 50%, 210-215° C.L., HB. drs, wks, frt equalgal.	...	.76	...	...	...	...
50%, 204-206° C.L., LB, drs, wks, frt equal ..gal.	...	.76	...	...	...	...
Crotonic, bbls, delv .....lb.	.26	.50	.21	.50	.21	.50
Formic, tech, 140 lb drs ..lb.	.10½	.11½	.10½	.11½	.10½	.11½
Fumaric, bbls ....lb.	.27	.28	.24	.28	.24	.75
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls ....lb.	1.05	1.08	.90	1.08	.75	.93
USP, bbls ....lb.	1.07	1.10	...	1.10	.92	.95
H, 225 lb bbls, wks .....lb.		45	...	.45	...	.45
Hydriodic, USP 47% ....lb.	2.42	2.44	2.42	2.44	2.30	2.42
Hydrobromic, 34% conct 155 lb cbys, wks ....lb.	.35	...	.35	...	.35	.44
Hydrochloric, see muriatic						
Hydrofluoric, 30%, 400 lb bbls, wks ....lb.	.06	.06½	.06	.06½	.06	.06½
Hydrofluosilicic, 35%, 400 bbls, wks ....lb.	.09	.09¼	.09	.09¼	.09	.09½
Lactic, 22%, dark, 500 lb bbls ....lb.	.02½	.03¾	.02½	.03¾	.02½	.03¾
22%, light ref'd, bbls ..lb.	.03½	.04¾	.03½	.04¾	.03½	.04¾
44%, light, 500 lb bbls..lb.	.06½	.07¼	.06½	.07¼	.06½	.07¾
44%, dark, 500 lb bbls..lb.	.05½	.06¾	.05½	.06¾	.05½	.06¾
50%, water white, 500 lb bbls ....lb.	.10½	.11½	.10½	.11½	.10½	.11½
Lauric, drs ....lb.	.18	.18½	.15	.18½	.12	.14½
Laurent's, 250 lb bbls ....lb.	...	.45	...	.45	.45	.46
Maleic, powd, kgs ....lb.	...	.30	...	.30	.30	.40
Malic, powd, kgs ....lb.	...	.47	...	.47	...	.47
Mixed, tks, wks ......N unit	.05	.06	.05	.06	.05	.07¼
S unit	.0085	.009	.0085	.009	.008	.009
Monochloracetic, tech, bbls lb.	.15	.18	.15	.18	.15	.18
Monosulfonic, bbls ....lb.	...	1.50	...	1.50	1.50	1.60

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls; *y* Price given is per gal.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Muriatic, 18°, 120 lb cbys, c-l, wks ....100 lb.	...	1.50	...	1.50	...	1.50
tks, wks ....100 lb.	...	1.05	...	1.05	1.00	1.05
20°, cbys, c-l, wks..100 lb.	...	1.75	...	1.75	...	1.75
tks, wks ....100 lb.	...	1.15	...	1.15	1.10	1.15
22°, c-l, cbys, wks..100 lb.	...	2.25	...	2.25	...	2.25
tks, wks ....100 lb.	...	1.65	...	1.65	1.60	1.65
CP, cbys ....lb.	.06½	.08	.06½	.08	.06½	.08
N & W, 250 lb bbls ......lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	nom.	.10	nom.	nom.	.14
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks ....100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv ....lb.	.11½	.13	.11½	.13	.11½	.13
Oxalic, 300 lb bbls, wks, or N Y ....lb.	.10¾	.14	.10¾	.14	.10¾	.12
Phosphoric, 85%, USP, cbys lb.	...	.12	...	.12	.12	.14
50%, acid, c-l, drs, wks lb.	...	.10½	.10½	.12	.06	.12
75%, acid, c-l, drs, wks lb.	.0725	.0850	.07½	.0850	...	.07½
Picric, kgs, wks ....lb.	...	.35	...	.35	.35	.40
Propionic, 98% wks, drs..lb.	...	.25	...	.25	...	.25
80% ....lb.	...	.14	...	.14	.14	.20
Pyrogallic, tech, lump, pwd, bbls ....lb.	...	1.35	1.20	1.35	1.05	1.20
cryst, USP ....lb.	...	2.00	1.70	2.25	1.55	2.25
Ricinoleic, bbls ....lb.	.32	.37	.32	.37	.27	.33
Salicylic, tech, 125 lb bbls, wks ....lb.	...	.33	...	.33	...	.33
USP, bbls ....lb.	.35	.38	.35	.40	.35	.40
Succinic, bbls ....lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	...	.17	...	.17	.17	.18
Sulfuric, 60°, tks, wks ..ton	...	13.00	...	13.00	...	13.00
c-l, cbys, wks ....100 lb.	...	1.25	...	1.25	...	1.25
66°, tks, wks ....ton	...	16.50	...	16.50	...	16.50
c-l, cbys, wks ....100 lb.	...	1.50	...	1.50	...	1.50
CP, cbys, wks ....lb.	.06½	.08	.06½	.08	.06½	.08
Fuming (Oleum) 20% tks, wks ....ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls..lb.	.66	.68	.54	.68	.44	.56
Tartaric, USP, gran, powd, 300 lb bbls ....lb.	...	.63½	.46¼	.63½	.35¼	.46¼
Tobias, 250 lb bbls ....lb.	.55	.60	.55	.60	.55	.60
Trichloroacetic bottles ....lb.	2.00	2.50	2.00	2.50	2.00	2.50
kgs ....lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls ......lb.	no prices		no prices		no prices	
Albumen, light flake, 225 lb. bbls ....lb.	.60	.70	.55	,70	.55	.62
dark, bbls ....lb.	.13	.18	.13	.18	.13	.18
egg, edible ....lb.	1.60	1.70	.65	1.70	.53	.65
Alcohol, Amyl (from Pentane) tks, delv ....lb.	...	.121	.111	.121	...	.111
c-l, drs, delv ....lb.	...	.131	.121	.131	...	.121
lcl, drs, delv ....lb.	...	.141	.131	.141	...	.131
Amyl, normal l-c-l drs Wyandotte, Mich. .....lb.	...	.25	...	.25	...	.25
secondary, tks, delv ....lb.						
drs, c-l, delv E of Rockies ....lb.	...	.09½	...	.09½	...	.09½
tertiary, rfd, l-c-l, drs, f.o.b., Wyandotte, frt all'd ....lb.	.	.09	...	.09	...	.09
Benzyl, cans ....lb.	.65	.75	.65	.75	.68	1.00
Butyl, normal, tks, f.o.b. wks, frt all'd ......lb. *d*	...	.10	.09	.10	...	.09
c-l, drs, f.o.b. wks, frt all'd ....lb. *d*	...	.11	.10	.11	...	.10
Butyl, secondary, tks, delv ....lb. *d*	...	.08	.07¼	.08	...	.07¼
c-l, drs, delv ....lb. *d*	...	.09	.08¼	.09	...	.08¼
Butyl, tert denat cl drs lb.	...	.12½	...	.12½	...	...
lcl drs ....lb.	...	.13	...	.13	...	...
tks ....lb.	...	.11½	...	.11½	...	...
Capryl, drs, tech, wks ..lb.	.	.85	...	.85	...	.85
Cinnamic, bottles ....lb.	2.80	3.40	2.33	3.40	2.00	2.50
Denatured, CD, 14, c-l drs, wks ....gal. *e*	.36½	.38½	.36½	.38½	.32½	.36½
tks, East, wks ....gal.	.30½	.32½	...	.26½	.25½	.26½
Western schedule, c-l, drs, wks ....gal. *e*	...	.40½	...	.40½	.34½	.37½
Denatured, SD, No. 1, tks,	..	.27	...	.28½	.23½	.24½

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher: *e* Anhydrous is 5c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

RESINS

THE COMPLETE RESIN LINE

S & W Naturals		S & W Synthetics
Accroides	*Congo*	"S & W" ESTER GUM—*all types*
Batu	*Pontianak*	"AROFENE"*—*pure phenolics*
Batavia Damars	*Manila*	"AROCHEM"*—*modified types*
Singapore Damars	*Loba*	"CONGO GUM"—*raw, fused and esterified*
Black East Indias	*Elemi*	"AROPLAZ"*—*alkyds*
Pale East Indias	*Kauri*	

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PHOSPHORIC ACID 75% Pure Food Grade. Made from high quality elemental phosphorus.

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FLORIDA PEBBLE PHOSPHATE ROCK
Grades 77% B. P. L. and all standards to 68%. Also of special specifications—quality—calcining—grinding.

THE PHOSPHATE MINING CO.

110 WILLIAM STREET, NEW YORK NICHOLS, FLORIDA

Prices Current

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Alcohols (continued):						
Diacetone, pure, c-l drs, delv ... lb. *f*	.11½	.12	.09½	.12	...	.12
tech, contract, drs, c-l, delv ... lb.	.10	.11	.09	.11	...	.11½
Ethyl, 190 proof, molasses,						
tks ... gal. *g*	...	5.96½	...	5.96½	5.93½	5.94½
c-l, drs ... gal. *g*	...	6.02½	...	...	5.92½	6.00½
c-l, bbls ... gal. *g*	...	6.03½	...	...	6.00½	6.01½
Furfuryl, tech, 500 lb drs lb.	.20	.25	.20	.25	.25	.35
Hexyl, secondary tks, delv lb.	...	.12	...	.12	...	.12
c-l, drs, delv ... lb.	...	.13	...	.13	...	.13
Normal, drs, wks ... lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delv ... lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs .. lb.	...	.086	.079	.086	...	.079
c-l, drs ... lb.	...	.076	.069	.076	...	.069
tks ... lb.	...	.076	.069	.076	...	.069
Isopropyl, ref'd, 91%, c-l, drs, f.o.b. wks, frt all'd ... lb.	...	.66½	...	.66½	...	.65
Ref'd 98%, drs, f.o.b. wks, frt all'd ... gal.	...	.65	...	.65	...	.65
Tech 91%, drs, above terms ... gal.	.35	.40	.35	.40	...	.33½
tks, same terms ... gal.	...	.30	...	.30	...	.28½
Tech 98%, drs, above terms ... gal.	...	.44	...	.44	.36	.37½
tks, above terms ... gal.	...	.37½	...	.37½	.31	.32½
Spec. Solvent, tks, wks gal.	...	.28	...	.28	.23½	.25½
Aldehyde ammonia, 100 gal drs ... lb.	.65	.70	.65	.70	.65	.82
Aldehyde Bisulfite, bbls, delv ... lb.	...	.17	...	.17	...	.17
Aldol, 95%, 55 and 110 gal, drs, delv ... lb.	.12	.15	.11	.15	.11	.12
Alphanaphthol, crude, 300 lb. bbls ... lb.	...	52	...	.52	...	.52
Alphanaphthylamine, 350 lb bbls ... lb.	...	.32	...	.32	.32	.34
Alum, ammonia, lump, c-l,						
bbls, wks ... 100 lb.	...	3.75	...	3.75	...	3.75
delv NY, Phila ... 100 lb.	...	3.75	...	3.75	...	3.75
Granular, c-l, bbls wks ... 100 lb.	...	3.50	...	3.50	...	3.50
Powd, c-l, bbls, wks 100 lb.	...	3.90	...	3.90	...	3.90
Potash, lump, c-l, bbls, wks ... 100 lb.	...	4.00	...	4.00	...	4.00
Granular, c-l, bbls, wks ... 100 lb.	...	3.75	...	3.75	...	3.75
Powd, c-l, bbls, wks 100 lb.	...	4.15	...	4.15	...	4.15
Soda, bbls, wks ... 100 lb.	...	3.25	...	3.25	...	3.25
Chrome, bbls ... 100 lb.	no prices		no prices		6.50	6.75
Aluminum metal, c-l, NY 100 lb.	17.00	18.00	17.00	18.00	18.00	20.00
Acetate, 20%, bbls ... lb.	.08½	.09	.08	.09	.07½	.09
Basic powd, bbls, delv lb.	.40	.50	.35	.50	.35	.50
24% basic, bbls, delv lb.	.09½	.10	.09½	.12	...	...
Insoluble basic powder, bbls, delv ... lb.	.40	.50	.35	.50	...	...
Chloride anhyd 99% wks lb.	.08	12	.08	.12	.08	.12
93%, wks ... lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06½	.06	.06½	.06	.06½
Solution, drs, wks ... lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
Formate, 30% sol bbls, c-l, delv ... lb.	.13	.15	.13	.15	...	.13
Hydrate, 96%, light, 90 lb. bbls, delv ... lb.	...	.14½	.12½	.14½	12½	.13½
heavy, bbls, wks ... lb.	.029	.03½	.029	.03½	.029	.03½
Oleate, drs ... lb.	.17½	.20	.17½	.20	.16¾	.20
Palmitate, bbls ... lb.	.20½	.21½	.20½	.21½	.20½	.24½
Resinate, pp., bbls ... lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls ... lb.	...	.21	.18	.21	.19	.20
Sulfate, com, c-l, bgs, wks ... 100 lb.	...	1.15	...	1.15	...	1.15
c-l, bbls, wks ... 100 lb.	...	1.35	...	1.35	...	1.35
Sulfate, iron-free, c-l, bags, wks ... 100 lb.	...	1.85	1.60	1.85	1.60	1.80
c-l, bbls, wks ... 100 lb.	...	2.05	1.80	2.05	1.65	1.80
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd fert com, tks lb.	...	.05	.04½	.05	.04½	.05
Ammonia anhyd, 100 lb cyl lb.	...	.16	...	.16	...	.16
50 lb cyl ... lb.	...	.22	...	.22	...	.22
26°, 800 lb drs, delv .. lb.	.02¼	.02½	.02¼	.02½	.02¼	.02½
Aqua 26°, tks, NH₃ .. cont.		.05¼ z	.04	.05¼ z	.04	.05¼
Ammonium Acetate, kgs .. lb.	.27	.33	.27	.33	.27	.33
Bicarbonate, bbls, f.o.b. wks ... 100 lb.	.0564	.0614	.0564	.0614	...	.0564
Bifluoride, 300 lb bbls .. lb.	.15½	.17	.14	.17	.14½	.16½
Carbonate, tech, 500 lb bbls ... lb.	.08¼	.09¼	.08¼	.09¼	.08¼	.11
Chloride, White, 100 lb bbls, wks ... 100 lb.	4.45	..	4.45	...	4.45	4.90
Gray, 250 lb bbls, wks ... 100 lb.	5.50	5.75	5.50	5.75	5.50	6.25
Lump, 500 lb cks spot lb.	no prices		no prices		no prices	
Lactate, 500 lb bbls ... lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls ... lb.	...	.23	...	.23	...	.23
Linoleate, 80% anhyd, bbls ... lb.	...	.12	...	.12	...	.12
Naphthenate, bbls ... lb.	...	.17	...	.17	...	.17
Nitrate, tech, bbls ... lb.	.0435	.0455	.0435	.0455	...	.0455
Oleate, drs ... lb.	...	.14	...	.14	...	.14
Oxalate, neut, cryst, powd, bbls ... lb.	.19	.25	.19	.25	.19	.25
Perchlorate, kgs ... lb.	no stocks		no stocks		no stocks	
Persulfate, 112 lb kgs .. lb.	.21	.22	.21	.22	.21	.22

f Prices are 1c higher in each case.
g Grain alcohol 25c a gal. higher in each case. ** On a delv. basis.
z On a f.o.b. wks. basis.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Ammonium (continued):						
Phosphate, diabasic tech, powd, 325 lb **bbls** ... lb.	.07¼	...	.07¼	.09¼	.07¼	.10
Ricinoleate, bbls ... lb.	...	.15	...	.15	...	.15
Stearate, anhyd, **bbls** ... lb.	...	.24½	...	.24½	...	.24½
Paste, bbls ... lb.	...	.06½	...	.06½	...	.06½
Sulfate, dom, f.o.b., bulk ton	29.00	30.00	29.00	30.00	...	29.00
Sulfocyanide, pure, kgs .. lb.	...	.65	...	.65	...	.65
Amyl Acetate (from pentane)						
tks, delv ... lb.	...	.115	.105	.115	...	.105
c-l, drs, delv ... lb.	...	.125	.115	.125	...	.115
lcl, drs, delv ... lb.	...	.135	.125	.135	...	.125
tech drs, delv ... lb.	...	.11½	.11½	.12	...	.12
Secondary, tks, delv .. lb.	...	.08½	...	.08½	...	.08½
c-l, drs, delv ... lb.	...	09½	...	.09½	...	.09½
tks, delv ... lb.	...	.08½	...	.08½	...	.08½
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed l c l drs, wks lb.	...	.07	.0565	.07	.0535	.0665
tks, wks ... lb.	...	.05	.0465	.05	...	.0465
Mercaptan, drs, wks ... lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs ... lb.	...	.25	...	.25	...	.25
Stearate, lcl, wks, drs .. lb.	...	.26	...	.26	...	.26
Amylene, drs, wks ... lb.	.102	.11	.102	.11	.102	.11
tks, wks ... lb.	...	.09	...	.09	...	.09
Amylnaphthalenes, see Mixed Amylnaphthalenes						
Aniline Oil, 960 lb drs and tks ... lb.	...	.14½	...	.14½	...	.14½
Annatto fine ... lb.	.34	.39	.34	.39	.34	.39
Anthracene, 80-85% ... lb.	...	.55	...	.55	...	.55
Anthraquinone, sublimed, 125 lb bbls ... lb.	...	.70	.65	.70	...	.65
Antimony metal slabs, ton lots ... lb.	.14	nom.	.14	.16½	...	.14
Butter of, see Chloride						
Chloride, soln, cbys ... lb.	...	.17	...	.17	...	.17
Needle, powd, bbls ... lb.	...	.16	...	.16	.16	.22
Oxide, 500 lb bbls ... lb.	.14½	.16½	.12	.16½	.13	.15¾
Salt, 63% to 65%, drs lb.	...	.33	.28	.33	.28	nom.
Archil, conc, 600 lb bbls lb.	no prices		no prices		no prices	
Double, 600 lb bbls ... lb.	no prices		no prices		no prices	
Aroclors, wks ... lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbls ... lb.	.10	.10½	.09½	.10½	.09	.10
Arsenic, Metal ... lb.	no prices		no prices		...	...
Red, 224 lb cs kgs ... lb.	no prices		no prices		.17½	.18
White, 112 lb kgs ... lb.	.04	.04¾	.03½	.04¾	.03	.04¼
Barium Carbonate precip, 200 lb bgs, wks ... ton	45.00	50.00	45.00	50.00	45.00	62.50
Nat (witherite) 90% gr, c-l, wks, bgs ... ton	...	43.00	...	43.00	43.00	47.00
Chlorate, 112 lb kgs, NY lb.	no prices		...	.45	.20	.45
Chloride, 600 lb bbls, delv, zone 1 ... ton	77.00	92.00	77.00	92.00	77.00	92.00
Dioxide, 88%, 690 lb drs lb.	...	.10	...	.10	.10	.12
Hydrate, 500 lb bbls ... lb.	.06	.07	.05½	.07	.05½	.07
Nitrate, bbls ... lb.	.09½	.10½	.08½	.10½	.09½	.10½
Barytes, floated, 350 lb bbls c-l, wks ... ton	...	25.15	...	25.15	.	25.15
Bauxite, bulk, mines ... ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, 325 mesh, bgs, wks ... ton	...	16.00	...	16.00	...	16.00
200 mesh ... ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb. drs, wks ... lb.	.45	.55	.45	.55	.55	.60
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal.	...	.14	...	.14	.14	.16
90% c-l, drs ... gal.	...	.19	...	.19	.19	.21
Ind pure, tks, frt all'd gal.	...	.14	...	.14	.14	.16
Benzidine Base, dry, 250 lb. bbls ... lb.	...	.70	...	.70	...	.70
Benzoyl Chloride, 500 lb drs lb.	.23	.28	.23	.28	.23	.28
Benzyl Chloride, 95-97% rfd, drs ... lb.	.22	.24	.19	.24	.19	.21
Beta-Naphthol, 250 lb bbls, wks ... lb.	.23	.24	.23	.24	.23	.24
Naphthylamine, sublimed, 200 lb bbls ... lb.	1.25	...	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ... lb.	.51	...	.51	.52	.51	.52
Bismuth metal ... lb.	...	1.25	...	1.25	...	1.25
Chloride, boxes ... lb.	...	3.00	3.00	3.25	3.20	3.25
Hydroxide, **boxes** ... lb.	3.35	3.46	3.35	3.46	3.35	3.46
Oxychloride, **boxes** ... lb.	3.10	3.19	3.10	3.19	...	3.10
Subbenzoate, **boxes** ... lb.	...	3.40	...	3.40	3.25	3.36
Subcarbonate, **kgs** ... lb.	1.73	1.85	1.73	1.85	1.73	1.76
Subnitrate, fibre, **drs** ... lb.	1.20	1.57	1.20	1.57	1.48	1.51
Trioxide, powd, boxes .. lb.	...	3.65	...	3.65	3.56	3.57
Blanc Fixe, Pulp, 400 lb. bbls, wks ... **ton** *h*	35.00	42.50	35.00	42.50	50.00	80.00
Bleaching Powder, 800 lb drs,						
c-l, wks, contract 100 lb.	2.00	2.85	2.00	2.85	...	2.85
lcl, drs, wks ... lb.	2.25	3.35	2.25	3.35	2.25	3.35
Blood, dried, f.o.b., NY unit	...	3.50	2.40	3.50	2.25	3.35
Chicago, high grade .. unit	...	3.60	2.50	3.75	2.00	3.50
Imported shipt ... unit	...	3.35	2.45	3.25	2.25	3.30
Blues, Bronze Chinese ...						
Prussian Soluble ... lb.	...	.33	...	.33	.33	.37
Milori, bbls ... lb.	...	.33	.33	.34	.33	.34
Ultramarine,* dry, wks, bbls ... lb.	...	.11	...	.11	...	.11
Regular grade, group 1 lb.	.16	.27	.16	.20	...	.16
Pulp, Cobalt grade ... lb.	.22	.24	.22	.24	.22	.27
Bone, 4½ + 50% raw, Chicago ... ton	...	37.50	30.00	37.50	30.00	33.00
Bone Ash, 100 lb kgs ... lb.	.06	.07	.06	.07	.06	.07
Meal, 3% & 50%, imp ton	...	37.00	31.50	37.00	31.50	32.50
Domestic, bgs, Chicago ton	34.00	35.00	32.00	35.00	29.00	32.00

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals \$6 per ton higher; USP, \$15 higher in each case; *Freight is equalized in each case with nearest producing point.

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AMMONIUM SULPHATE
Purified
AMMONIUM CHLORIDE
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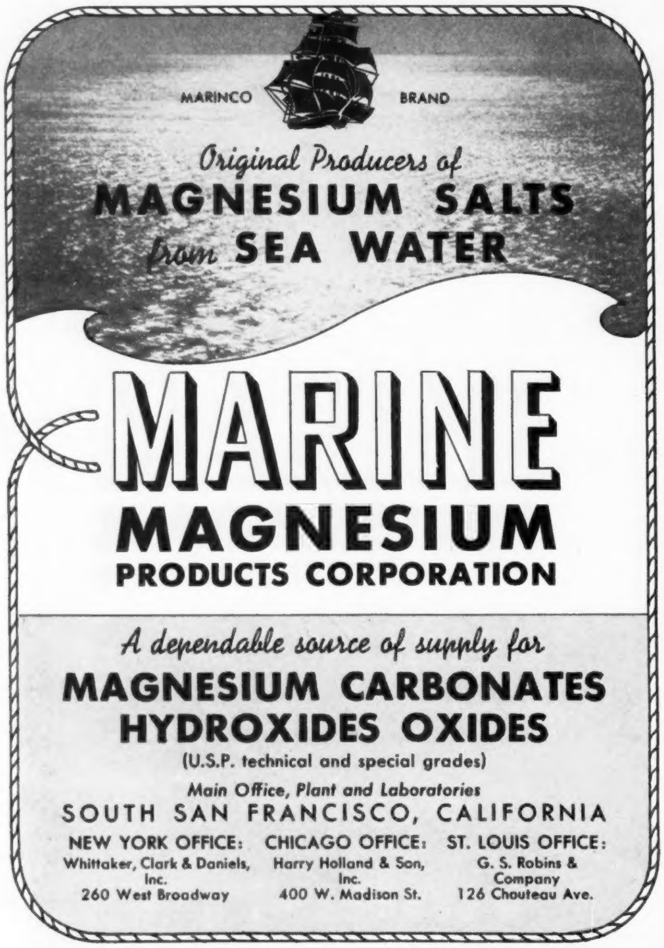
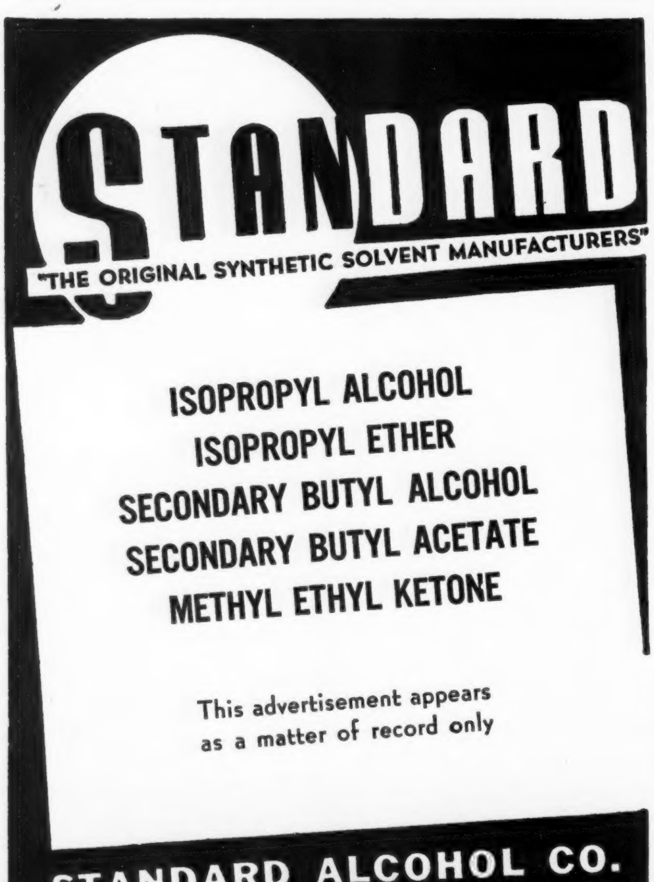
AMERICAN-BRITISH CHEMICAL SUPPLIES, Inc.
180 MADISON AVE., NEW YORK, N.Y.





	Current Market		1941 Low	1941 High	1940 Low	1940 High
Borax, tech, gran, 80 ton lots,						
sacks, delv ....ton j	...	43.00	...	43.00	...	43.00
bbls, delv ....ton j	...	53.00	...	53.00	...	53.00
Tech, powd, 80 ton lots,						
sacks ....ton	...	48.00	...	48.00	47.00	48.00
bbls, delv ....ton	...	58.00	...	58.00	57.00	58.00
Bordeaux Mixture, drs ...lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases ....lb.	.25	.30	.25	.30	.25	.43
Bronze, Al, pwd, 300 lb drs lb.	...	.57	...	.57	...	.57
Gold, blk ....lb.	.60	.65	.60	.65	.60	.65
Butanes, com 16-32° group 3 tks ....lb.	.02½	.03	.02½	.03	.02¼	.03¾
Butyl, acetate, norm drs, frt all'd ....lb.	...	.11	.10	.11	...	.10
tks, frt all'd ....lb.	...	.10	.09	.10	...	.09
Secondary, tks, frt all'd lb.	...	.08	.07¼	.08	...	.08
drs, frt all'd ....lb.	.09½	.08¼	.09½	.08¾	.07½	.08
Aldehyde, 50 gal drs, wks ....lb.	.15½	.17½	.15½	.17½	.15½	.17½
Carbinol, norm (see Normal Amyl Alcohol)						
Crotonate, norm, 55 and 110 gal drs, delv .....lb.	...	.35	...	.35	...	.35
Lactate ....lb.	...	.23½	...	.23½	.23½	.24½
Oleate, drs, frt all'd ...lb.	...	.25	...	.25	...	.25
Propionate, drs ....lb.	.16½	.17	.16½	.17	.16½	.17
tks, delv ....lb.	...	.15½	.	.15½	...	.15½
Stearate, 50 gal drs ....lb.	...	.32½	.28½	.32½	...	.28½
Tartrate, drs ....lb.	no prices		.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.	...	.35½	...	.35½	...	.35½
Cadmium Metal ....lb.	.95	nom.	.80	.95	.80	.85
Sulfide, orange, boxes ..lb.	...	1.10	...	1.10	.75	.85
Calcium, Acetate, 150 lb bgs c-l, delv ....100 lb.	...	3.00	1.90	3.00	...	1.90
Arsenate, c-l, E of Rockies, dealers, drs ....lb.	.06½	.07½	.06	.07½	.06	.07¼
Carbide, drs ....lb.	...	.04¾	...	.04¾	.05	.06
Carbonate, tech, 100 lb bgs, c-l ....ton	16.00	20.00	16.00	20.00	...	...
Chloride, flake, 375 lb drs, burlap bgs, c-l, delv..ton	...	20.50	...	20.50	...	22.00
paper bags, c-l, delv..ton	20.50	35.00	20.50	35.00	20.50	36.00
Solid, 650 lb drs, c-l, delv ....ton	19.00	33.00	19.00	33.00	19.00	35.00
Ferrocyanide, 350 lb bbls wks ....lb.	...	.20	...	.20	...	.20
Gluconate, Pharm, 125 lb bbls ....lb.	.50	...	.50	.57	.50	.57
Levulinate, less than 25 bbl lots, wks ....lb.	...	3.00	...	3.00	...	3.00
Nitrate, 100 lb bags ...ton	no prices		no prices		28.00	29.00
Palmitate, bbls ....lb.	.22	.24	.22	.24	.22	.24
Phosphate, tribasic, tech, 450 lb bbls ....lb.	.0635	.0705	.0635	.0705	.0635	.07½
Resinate, precip, bbls ..lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ...lb.	.24	.25	.20½	.25	.20½	.22½
Camphor, slabs ....lb.	1.15	nom.	.73	1.15	.82	.84
Powder ....lb.	.73	.74	.74	.83	.82	.84
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Black, c-l, bgs, f.o.b. plants ....lb.	...	.03425	.03325	.03425	.02¾	.03¾
lcl, bgs, f.o.b. whse ..lb.	...	.075	.07025	.075	...	.06525
Decolorizing, drs, c-l ..lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 55 or 110 gal drs, c-l, delv . lb.	...	.66½	...	.66½	...	.66½
Casein, Standard, Dom, grd lb.	.27	.28	.11½	.28	.10	.14½
80-100 mesh, c-l bgs ...lb.	.27½	.28½	.12	.28½	.11	.15
Castor Pomace, 5½ NH_3, c-l, bgs, wks ....ton	15.00	...	15.00	...	15.00	17.50
Imported, ship, bgs ....ton	no prices		no prices		...	20.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.12	.15
Transparent, cs ...... lb.	...	.20	..	.20	...	.20
Cellulose, Acetate, frt all'd, 50 lb kgs ....lb.	...	.30	...	.30	.30	.34
Triacetate, flake, frt all'd ....lb.	...	.30	...	.30	...	...
Chalk, dropped, 175 lb bbls lb.	...	.02¾	...	.02¾	.02¾	.03¾
Precip, heavy, 560 lb cks lb.	...	.03¼	...	.03¼	.02¾	.03¼
Light, 250 lb cks ......lb.	...	.03¼	...	.03¼	.03¼	.04
Charcoal, Hardwood, lump, blk, wks ....bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv* . ton	25.00	36.00	25.00	36.00	25.00	36.00
Willow, powd, 100 lb bbls, wks ....lb.	.06	.07	.06	.07	.06	.07
Chestnut, clarified tks, wks lb.	...	.0190	.01¾	.0190	...	.01¾
25%, bbls, wks .... lb.	...	.0240	...	.0240	...	.02½
China Clay, c-l, blk mines ton	...	7.60	...	7.60	7.60	9.50
Imported, lump, blk ...ton	18.60	25.00	...	18.60	25.00	26.00
Chlorine, cyls, lcl, wks, contract ....lb.	...	.07¼	...	.07¼	.07½	.08½
cyls, c-l, contract ...lb j	...	.05¼	...	.05¼	...	.05¼
Liq. tk, wks, contract 100 lb.	...	1.75	...	1.75	...	1.75
Multi, c-l, cyls, wks, cont ....lb.	...	019	...	.019	...	.019
Chloroacetophenone, tins, wks .... lb.	3.00	3.50	3.00	3.50	3.00	3.50
Chlorobenzene, Mono, 100 lb. drs, lcl, wks ....lb.	...	.08	.06	.08	.06	.08
Chloroform, tech, 1000 lb drs .... lb.	...	.20	...	.20	.20	.21
USP, 25 lb tins ....lb.	...	.30	...	.30	.30	.31
Chloropicrin, comml cyls ..lb.	...	.80	...	.80	...	.80
Chrome, Green, CP ......lb.	.21	.25	.21	.25	.21	.25
Yellow ....lb.	...	.14½	.13½	.14½	.13½	.14½
Chromium Acetate, 8% Chrome, bbls ....lb.	no price		...	.05¾	...	.05¾

j A delivered price; * Depends upon point of delivery.

Current

Chromium Fluoride
Dimethylaniline

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Chromium (continued)						
Fluoride, powd, 400 lb bbl .... lb.	.27	.28	.27	.28	.27	.28
Coal tar, bbls ....bbl.	7.50	7.75	7.50	7.75	7.50	8.00
Cobalt Acetate, bbls ....lb.	...	.80½	...	.80½	...	.80½
Carbonate tech, bbls ...lb.	...	1.58	...	1.58	1.38	1.60
Hydrate, bbls ....lb.	...	1.98	...	1.98	...	1.78
Linoleate, solid, bbls ...lb.	...	.33	...	.33	...	.33
paste, 6%, drs ......lb.	...	.31	...	.31	...	.31
Oxide, black, bgs ....lb.	...	1.84	...	1 84	...	1.84
Resinate, fused, bbls ...lb.	...	.13½	...	13½	...	.13½
Precipitated, bbls .....lb.	...	.34	...	.34	...	.34
Cochineal, gray or bk bgs lb.	.37	.38	.37	.38	.37	.38
Teneriffe silver, bgs ....lb.	.38	.39	.38	.39	.38	.39
Copper, metal, electrol 100 lb.	12.00	12.50	12.00	12.50	11.00	12.00
Acetate, normal, bbls, dlvd ....lb.	.24	.26	.22	.26	.22	.24
Carbonate, 52-54% 400 lb bbls ....lb.	.18	.20½	.1650	.20½	.1570	.169
Chloride, 250 lb bbls ...lb.	...	.19½	.16	.19½	.16	.18
Cyanide, 100 lb drs ....lb.	.34	.36	.34	.36	...	.34
Oleate, precip, bbls ....lb.	...	.20	..	.20	...	.20
Oxide, black, bbls, wks lb.	.19½	.21	.18	.21	.18	.18¼
red 100 lb bbls ......lb.	.20	.22	.19	.22	.19½	.20½
Sub-acetate verdigris, 400 lb bbls ....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks, 100 lb.	5.00	5.50	4.75	5.50	4.45	4.75
Copperas crys and sugar bulk c-l, wks ....ton	...	17.00	14.00	17.00	14.00	20.00
Corn Sugar, tanners, bbls 100 lb.	...	4.05	3.36	4.05	2.99	3.39
Corn Syrup, 42°, bbls 100 lb.	...	3.52	3.42	3.52	3.02	3.47
43°, bbls ....100 lb.	...	3.57	3.47	3.57	3.07	3.52
Cotton, Soluble, wet 100 lb. bbls ....lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, powd & gran 300 lb bbls ....lb.	...	.52½	38¼	.52½	.28¼	.38¼
Creosote, USP 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1 tks .....gal.	.13½	.14½	.13½	.14½	.13½	.14
Grade 2 ....gal.	.122	.132	.122	.132	.122	.132
Cresol, USP, drs, c-l .....lb.	...	.10¼	.09¾	.10¼	.09¾	.10¼
Crotonaldehyde, 97%, 55 and 110 gal drs, wks .....lb.	...	.15	.11	.15	.11	.12
Cutch, Philippine, 100 lb. bale lb.	...	.04¾	...	.04¾	.04	.04½
Cyanamid, pulv, bags, c-l, frt all'd, nitrogen basis, unit	no prices		...	1.40	...	1.40
Derris root 5% rotenone, bbls ....lb.	.28	.30	.21	.30	.21	.30
Dextrin, corn, 140 lb bgs f.o.b., Chicago ...100 lb.	...	4.00	3.80	4.00	3.40	3.80
British Gum, bgs ...100 lb.	...	4.25	4.05	4.25	3.65	4.10
Potato, Yellow, 220 lb bgs lb.	...	.08½	.08	.08½	...	.07¾
White, 220 lb bgs, lcl lb.	.08½	.09	.08½	.09	.08½	.09
Tapioca, 200 bgs, lcl ...lb.	...	.0715	...	.0715	...	.0715
White, 140 lb. bgs ..100 lb.	...	3.95	3.75	3.95	3.35	3.75
Diamylamine, c-l, drs, wks lb.	...	.47	...	.47	...	.47
lcl drs, wks ....lb.	...	.50	.48	.50	...	.50
Diamylene, drs, wks .....lb.	.095	.102	.095	.102	.095	.102
tks, wks ....lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs ....lb.	.085	.092	.085	.092	.085	.092
tks, wks ....lb.	...	.075	...	.075	...	.075
Diamylnaphthalene, l-c-l, drs, f.o.b. wks, ...lb.	...	.17	.17	.20	...	...
Diamylphthalate, drs, wks lb.	.21	.21½	.21	.21½	.21	.21½
Diamyl Sulfide, drs, wks lb.	...	1.10	...	1.10	...	1.10
Diatomaceous Earth, see Kieselguhr.						
Dibutoxy Ethyl Phthalate, drs, wks ....lb.	...	.35	...	.35	...	.35
Dibutylamine, lcl, drs, wks lb.	...	.53	...	.53	...	.53
c-l drs, wks ....lb.	...	.50	...	.50	...	.50
tks, wks ....lb.	...	.48	..	.48	...	.48
Dibutyl Ether, drs, wks, lcl lb.	.26	.28	.25	.28	...	.25
Dibutylphthalate, drs, wks, frt all'd ....lb.	.19	.20	.19	.20	.19	.19½
Dibutyltartrate, 50 gal drs lb.	...	.50	...	.50	...	.50
Dichlorethylene, drs .....lb.	...	.25	...	.25	...	.25
Dichloroethylether, 50 gal drs, wks ....lb.	.15	.16	.15	.16	.15	.16
tks, wks ....lb.	...	.14	...	.14	...	.14
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks lb.	...	.04	.025	.04	...	.025
tks, wks ....lb.	...	.025	.0221	.025	...	.0221
Diethanolamine, tks, wks..lb.	...	.22½	...	.22½	...	.22½
Diethylamine, 300 lb drs, lcl, f.o.b., wks ....lb.	...	.70	...	.70	...	.70
Diethylamino Ethanol, l-c-l, drs, f.o.b. Wyandotte, frt all'd E. Miss. ....lb.	...	.75	...	.75	...	...
Diethylaniline, 850 lb drs lb.	...	.40	...	.40	.40	.52
Diethylcarbonate, com drs lb.	...	.25	...	.25	...	.25
Diethylorthotoluidin, drs ..lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate,, c-l, drs lb.	...	.20	.19	.20	.19	.19½
Diethylsulfate, tech, drs, wks, lcl ....lb.	.13	.14	.13	.14	.13	.14
Diethyleneglycol, drs .....lb.	.14	.15½	.14	.15½	.14½	.15½
Mono ethyl ether, drs ..lb.	.14½	.15½	.14½	.15½	.14½	.16
tks, wks ....lb.	...	.13½	...	.13½	...	.13½
Mono butyl ether, drs ..lb.	.22½	.24½	.22½	.24½	.22½	.24½
tks, wks ....lb.	...	.22	...	.22	...	.22
Diethylene oxide, 50 gal drs, wks ....lb.	.20	.24	.20	.24	.20	.24
Diglycol Laurate, bbls ....lb.	...	.16	...	.16	.16	.21
Oleate, bbls ....lb.	...	.17	...	.17	.13	.17
Stearate, bbls ....lb.	...	.22	...	.22	.22	.26
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis ....lb.	1.00	1.05	1.00	1.05	1.00	1.05
Dimethylaniline, 240 lb drs lb.	.23	.24	.23	.24	.23	.24

* These prices were on a delivered basis.

Spot Deliveries

SODIUM HYDROSULPHITE

•

ZINC SULPHATE

•

COPPER CARBONATE

•

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•

NICKEL CHLORIDE

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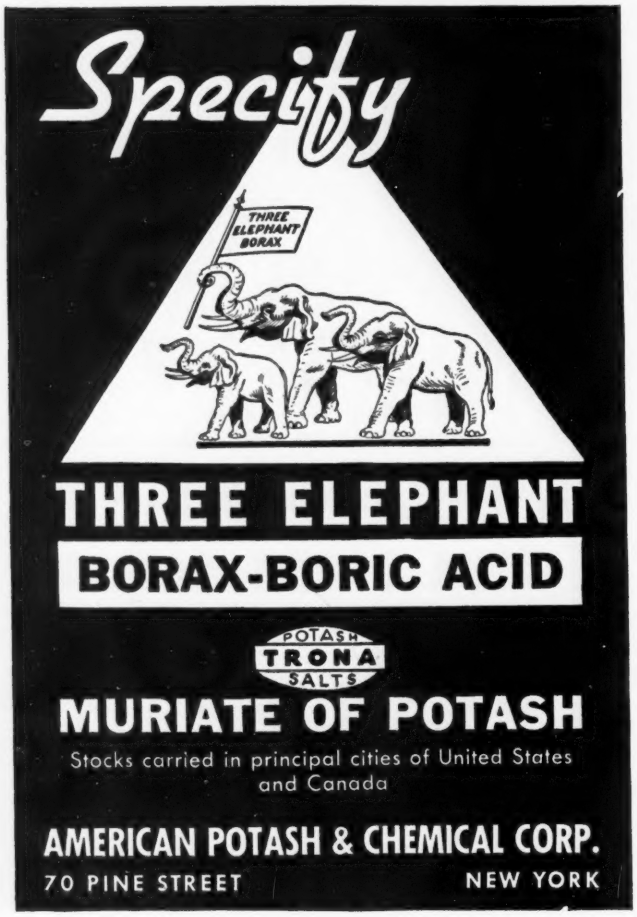

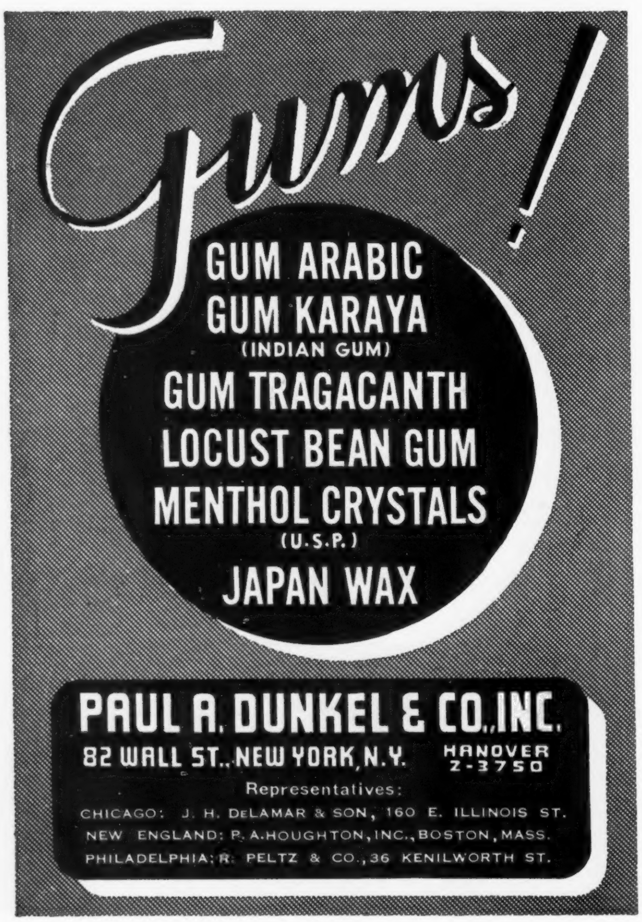

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Dimethyl phthalate, drs, wks, frt all'd .... lb.	...	.20	.18½	.20	...	.18½
Dimethylsulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb.	...	.18	...	.18	.18	.19
Dinitrochlorobenzene, 400 lb bbls .... lb.	...	.14	...	.14	...	.14
Dinitronaphthalene, 350 lb bbls .... lb.	.35	.38	.35	.38	.35	.38
Dinitrophenol, 350 lb bbls lb.	...	.22	...	.22	.22	.23
Dinitrotoluene, 300 lb bbls lb.	...	.18	.15½	.18	...	.15½
Diphenyl, bbls .... lb.	.15	...	.15	.20	.15	.20
Diphenylamine .... lb.	...	.25	...	.25	.25	.32
Diphenylguanidine, 100 lb drs .... lb.	.35	.37	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	.43	47.00	32.00	47.00	...	nom.
Extract .... lb.	.05¾	.06¾	.05¾	.06¾	.05¾	.06¾
Drymet (see sodium metasilicate anhydrous).						
Egg Yolk, dom., 200 lb. cases lb.	...	.90	.60	.90	.57	.62
Epsom Salt, tech, 300 lb bbls c-l, NY ..... 100 lb.	...	1.90	...	1.90	1.90	2.10
USP, c-l, bbls ..... 100 lb.	...	2.10	...	2.10	...	2.10
Ether, USP anaesthesia 55 lb drs .... lb.	...	.26	...	.26	...	.26
Isopropyl 50 gal drs ... lb.	.07	.08	.07	.08	.07	.08
tks, frt all'd .... lb.	...	.06	...	.06	...	.06
Nitrous conc bottles ... lb.	...	.73	...	.73	...	.68
Synthetic, wks, tks ..... lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester						
tks, frt all'd .... lb.	...	.07½	.06½	.07½	.06	.06½
drs, frt all'd .... lb.	...	.08½	.07½	.08½	.07	.08½
99%, tks, frt all'd ... lb.	...	.07¾	.06¾	.07¾	.06¼	.08
drs, frt all'd .... lb.	...	.08¾	.07¾	.08¾	.07¼	.08¾
Acetoacetate, 110 gal drs lb.	...	.27½	...	.27½	...	.27½
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Bromide, tech drs ..... lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt all'd .... lb.	.45	...	.45	.50	.45	.50
Chloride, 200 lb drs .... lb.	.18	.20	.18	.20	.18	.20
Chlorocarbonate, cbys .. lb.	...	.30	...	.30	...	.30
Crotonate, drs .... lb.	...	.35	...	.35	...	.35
Formate, drs, frt all'd .. lb.	.25	.26	.25	.26	.23	.24
Lactate, drs, wks ...... lb.	...	.33½	...	.33½	...	.33½
Oxalate, drs, wks ...... lb.	...	.25	...	.25	...	.25
Oxybutyrate, 50 gal drs, wks .... lb.	1.00	nom.	1.00	nom.	.30	1.00
Silicate, drs, wks ...... lb.	...	.77	...	.77	...	.77
Ethylene Dibromide, 60 lb drs .... lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont .... lb.	.75	.85	.75	.85	.75	.85
Anhydrous .... lb.	...	.75	...	.75	..	.75
Dichloride, 50 gal drs, E. Rockies .... lb.	...	.0742	.0693	.0746	.0595	.0694
Glycol, 50 gal drs, wks .. lb.	.14½	.18½	.14½	.18½	.14½	.18½
tks, wks .... lb.	...	.13½	...	.13½	...	.13½
Mono Butyl Ether, drs, wks .... lb.	.16½	.17½	.16½	.17½	.16½	.21
tks, wks .... lb.	...	.15½	...	.15½	...	.15½
Mono Ethyl Ether, drs wks .... lb.	.14½	.15½	.14½	.15½	.14½	.15½
tks, wks .... lb.	...	.13½	...	.13½	...	.13½
Mono Ethyl Ether Acetate, drs, wks ..... lb.	.11½	.12½	.11½	.12½	.11½	.13
tks, wks .... lb.	...	.10½	...	.10½	...	.10½
Mono Methyl Ether, drs wks .... lb.	.15½	.16½	.15½	.16½	.15½	.17
tks, wks .... lb.	...	.14½	...	.14½	...	.14½
Oxide, cyl .... lb.	.50	.55	.50	.55	.50	.55
Ethylideneaniline .... lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery .... ton	17.00	19.00	17.00	19.00	17.00	19.00
Powd, blk wks .... ton	14.00	17.50	14.00	17.50	14.00	17.50
Ferric Chloride, tech, crys, 475 lb bbls .... lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys .... lb.	.06½	.07	.06½	.07	.06¼	.07
Fish Scrap, dried, unground wks .... unit *l*	...	4.35	4.35	4.70	3.10	4.25
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis .... unit *m*	...	2.75	...	2.75	2.25	3.50
Fluorspar, 98% bgs .... ton	...	30.00	29.00	30.00	29.00	32.00
Formaldehyde, c-l, bbls, wks .... lb.	.055	.0575	...	...	...	...
Fossil Flour .... lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines ton	...	15.00	...	15.00	...	15.00
Imp powd, c-l, bgs .... ton	no prices		no prices		...	25.00
Furfural (tech) drs, wks lb.	...	.15	.10	.15	.10	.15
tks, wks .... lb.	...	.09	...	.09	...	...
Furfuramide (tech) 100 lb drs .... lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.17½	.19½	.16	.19½	.16	.17½
Fustic, crystals, 100 lb boxes .... lb.	...	.26	.24	.26	.24	.28
Liquid 50°, 600 lb bbls lb.	...	.11½	.10½	.14	.10½	.14
Solid, 50 lb boxes ... lb.	.19	.21	.19	.21	.19	.21
G Salt paste, 360 lb bbls .. lb.	...	.45	...	.45	.45	.47
Gambier, com 200 lb bgs .. lb.	nom.	.09	.06½	.09	.06½	.07
Singapore cubes, 150 lb bgs .... 100 lb.	.10	nom.	.08¼	.10½	.08¼	.10
Glauber's Salt, tech, c-l, bgs, wks* .... 100 lb.	1.05	1.28	.95	1.28	.95	1.18
Anhydrous, see Sodium Sulfate						
Glue, bone, com grades, c-l bgs .... lb.	.15½	.18	.13½	.18	.13½	.15½
Better grades, c-l, bgs lb.	.19	.30	.15	.30	.15	.23

l + 10; *m* + 50; * Bbls. are 20c higher.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Glycerin, CP, 550 lb drs lb.	...	.14½	...	.14½	...	.12½
Dynamite, 100 lb drs ...lb.	...	nom.	...	nom.		nom.
Saponification, drs .....lb.	.15½	nom.	.09½	.15½	.09½	.13
Soap Lye, drs ....lb.	.13	nom.	.07⅛	.13	.07⅛	.08¼
Glyceryl Bori-Borate, bbls lb.	...	.40	...	.40	...	.40
Monoricinoleate, bbls ...lb.	...	.27	...	.27	...	.27
Monostearate, bbls .....lb.	...	.30	...	.30	...	.30
Oleate, bbls ....lb.	...	.22	...	.22		.22
Phthalate ....lb.	...	.38	...	.38	.37	.38
Glyceryl Stearate, bbls ...lb.	...	.18	...	.18	...	.18
Glycol Bori-Borate, bbls ..lb.	...	.22	...	.22	...	.22
Phthalate, drs ....lb.	...	.38	...	.38	...	.38
Stearate, drs ....lb.	...	.26	...	.26	...	.26
GUMS						
Gum Aloes, Barbadoes ...lb.	.85	.90	.80	.95	.80	.90
Arabic, amber sorts lb.	.24	.25	.14	.25	.08½	.15
White sorts, No. 1, bgs lb.	.45	nom.	.35	.45	.28	.36
No. 2, bgs ....lb.	no prices		no prices		.27	.34
Powd, bbls ....lb.	.27	.30	.18	.30	.12½	.20
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b. NY ....lb.	.04½	.05½	04½	.05½	.02½	.10½
California, f.o.b. NY, drs ton	29.00	36.50	29.00	36.50	29.00	36.50
Egyptian, 200 lb cases, f.o.b. NY ....lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases ....lb.	.23	.24	.19	.20	.17	.24
Copal, Congo, 112 lb bgs, clean, opaque ....lb.	...	.49½	...	.49½	...	.49½
Dark amber ....lb.	...	.12¾	...	.12¾	.11⅜	.12⅜
Light amber ....lb.	...	.17	...	.17	...	.17
Copal, East India, 180 lb bgs						
Macassar pale bold ....lb.	...	.14⅞	.12¾	.14⅞	.12¾	.15⅝
Chips ....lb.	...	.10¼	.06¾	.10¼	.06¾	.09
Dust ....lb.	...	.07	.05¼	.07	.04¾	.06¾
Nubs ....lb.	...	.12	.10½	.12	.10½	.14⅜
Singapore, Bold ....lb.	...	.20⅞	.15¾	.20⅞	.14⅝	.17½
Chips ....lb.	...	.11½	.08½	.11½	.08½	.09⅛
Dust ....lb.	...	.07	.05¼	.07	.04¾	.06¾
Nubs ....lb.	...	.16¼	.11	.16¼	.11	.13½
Copal Manila, 180-190 lb	...	.14	.13⅞	.14	.13¾	.16¾
Loba B ....lb.	...	.14¼	.11¾	.14¼	.11¾	.16⅛
Loba C ....lb.	...	.13⅞	.11¼	.13⅞	.11¼	.14½
DBB ....lb.	...	.12¼	.10	.12¼	.06⅞	.12¼
MA sorts ....lb.	...	.10¼	.07¾	.10¼	.07¾	.13¾
Copal Pontianak, 224 lb cases, bold genuine ..lb.	...	.22⅞	.15⅜	.22⅞	.15⅛	.18½
Chips ....lb.	...	.12⅞	.10	.12⅞	.08⅜	.10½
Mixed ....lb.	...	.17⅞	.14⅜	.17⅞	.14⅛	.16⅝
Nubs ....lb.	...	.18⅞	.12¾	.18⅞	.10¾	.13½
Split ....lb.	...	.19⅝	.13¾	.19⅝	.13½	.16⅛
Damar Batavia, 136 lb cases						
A ....lb.	...	.25⅞	.21⅝	.25⅞	.21⅝	.22¾
B ....lb.	...	.24⅝	.20¼	.24⅝	.20⅛	.21⅛
C ....lb.	...	.20¾	.14⅝	.20¾	.15⅝	.15¼
D ....lb.	...	.18¼	.13¼	.18¼	.13¼	.13¾
A/D ....lb.	...	.20½	.15¼	.20½	.13⅞	.14½
A/E ....lb.	...	.18¼	.12⅞	.18¼	.12⅞	.13⅜
E ....lb.	...	.13⅜	.10	.13⅜	.10	.10⅜
F ....lb.	...	.10½	.08	.10½	.08	.08¾
Singapore, No. 1 ......lb.	...	.24	.16⅝	.24	.16⅝	.19⅝
No. 2 ....lb.	...	.17⅞	.12¼	.17⅞	.12¼	.15¾
No. 3 ....lb.	...	.09⅞	.07⅛	.09⅞	.07⅛	.09
Chips ....lb.	...	.16¾	.11	.16¾	.11	.12½
Dust ....lb.	...	.09⅞	.07⅛	.09⅞	.07⅛	.09
Seeds ....lb.	...	.13⅜	.09⅞	.13⅜	.09⅞	.10½
Elemi, cns, c-l ....lb.	.	.08½		.08½	.10⅛	.11⅝
Ester ....lb.	.07½	.09	.06¼	.09	.06¼	.06¾
Gamboge, pipe, cases .....lb.	.95	1.00	.95	1.00	.70	.75
Powd, bbls ....lb.	1.05	1.10	1.05	1.10	.75	.80
Ghatti, sol, bgs ....lb.	.11	.15	.11	.15	.11	.15
Karaya, bbls, bxs, drs ...lb.	.14	.33	.14	.33	.14	.33
Kauri, NY						
Brown XXX, cases ....lb.	...	.60	...	.60	...	.60
BX ....lb.	...	.38	...	.38	...	.38
B1 ....lb.	...	.28	...	.28	...	.28
B2 ....lb.	...	.24	...	.24	...	.24
B3 ....lb.	...	.18½	...	.18½	...	.18½
Pale XXX ....lb.	...	.61	...	.61	...	.61
No. 1 ....lb.	...	.41	...	.41	...	.41
No. 2 ....lb.	...	.24	...	.24	...	.24
No. 3 ....lb.	...	.17¾	...	.17¾	...	.17¾
Kino, tins ....lb.	no prices		no prices		2.00	4.50
Mastic ....lb.	1.50	1.65	1.50	1.65	.85	2.50
Sandarac, prime quality, 200 lb bgs & 300 lb cks ..lb.	.52½	.55	.50	.55	.35	.37
Senegal, picked bags .....lb.	...	.30	...	.30	...	.30
Sorts ....lb.	...	.13	...	.13	...	.13
Thus, bbls ....280 lbs.	...	16.50	15.00	16.50	15.00	15.25
Tragacanth, No. 1, cases ..lb.	3.25	3.40	2.75	3.40	2.65	3.50
No. 2 ....lb.	2.70	2.80	2.45	2.80	2.55	3.35
No. 3 ....lb.	1.10	1.20	1.10	2.60	2.45	2.90
Yacca, bgs ....lb.	.06½	.07¾	.03½	.07¾	.03½	.04
Hematine crystals, 400 lb bbls lb.	.22	.32	.20	.32	.20	.30
Hemlock, 25%, 600 lb bbls.						
wks ....lb.	...	.03½	.03⅛	.03½	.03⅛	.03⅜
tks ....lb.	...	.03	.02¾	.03	.02¾	.03
Hexalene, 50 gal drs, wks lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70° C. Group 3, tks ....gal.	...	.09¾	...	.09¾	...	.10½
Hexamethylenetetramine, powd, drs ....lb.	.32	.33	.32	.33	.32	.33
Hexyl Acetate, secondary, delv, drs ....lb.	.13	.13½	.13	.13½	.13	.13½
tks ....lb.	...	.12	.	.12	...	.12
Hoof Meal, f.o.b. Chicago unit	2.75	3.00	2.65	3.00	2.00	3.15
Hydrogen Peroxide, 100 vol, 140 lb cbys ....lb.	.16	.18½	.16	.18½	.16½	.20

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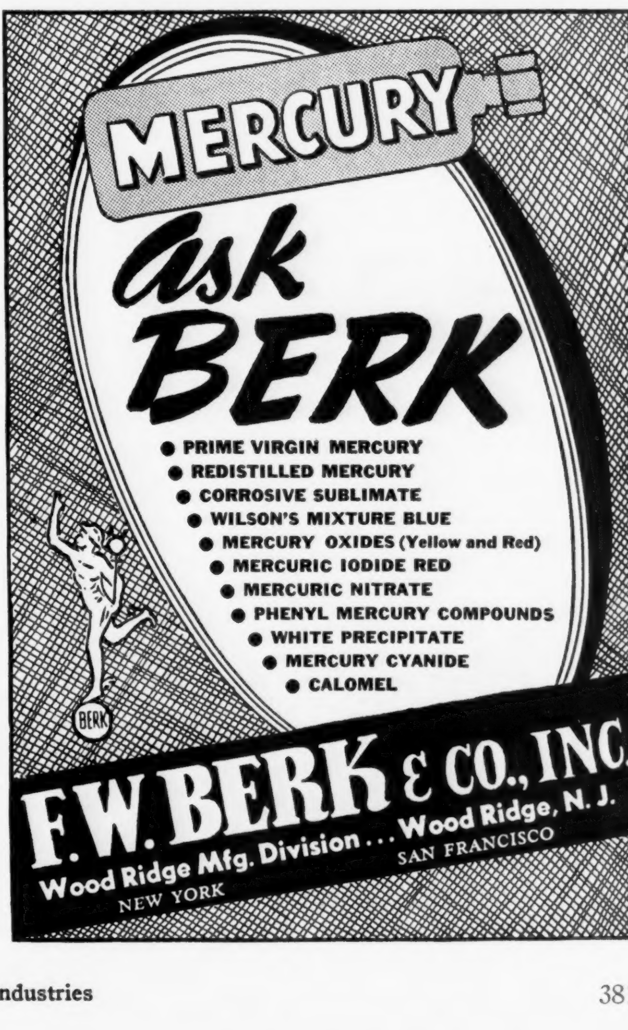

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Prices

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Hydroxylamine Hydrochloride ... lb.	...	3.15	...	3.15	...	3.15
Hypernic, Bags, No. 1 ... lb.	...	.40	...	.40	...	...
Indigo, Bengal, bbls ... lb.	2.14	2.20	1.63	2.20	1.63	1.67
Synthetic, liquid ... lb.	.16½	.19	.16½	.19	.16½	.19
Iodine, Resublimed, jars ... lb.	...	2.00	...	2.00	1.75	2.50
Irish Moss, ord, bales ... lb.	.25	.28	.25	.28	.15	.28
Bleached, prime, bales ... lb.	.32	.35	.32	.35	.28	.35
Iron Acetate Liq. 17°, bbls delv ... lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls ... 100 lb.	3.50	4.00	3.50	4.00	2.75	4.00
Isobutyl Carbinol (128-132° C)						
drs, frt all'd ... lb.	...	.23½	.22½	.23½	.22½	.34
tks, frt all'd ... lb.	...	.21½	...	.21½	.21½	.32
Isopropyl Acetate, tks, frt all'd ... lb.	...	.07½	.06½	.07½	.05½	.06½
drs, frt all'd, c-l ... lb.	...	.08½	.07½	.08½	.06½	.07½
Ether, see Ether, isopropyl.						
Keiselguhr, dom bags, c-l, Pacific Coast ... ton	22.00	25.00	22.00	25.00	22.00	35.00
Lead Acetate, f.o.b. NY, bbls,						
White, broken ... lb.	.12	.12½	.11	.12½	...	.11
cryst, bbls ... lb.	.12	.12½	.11	.12½	...	.11
gran bbls ... lb.	.12¾	.13¼	.11¾	.13¼	...	.11¾
powd, bbls ... lb.	.12¾	.13¼	.11¾	.13¼	...	.11¾
Arsenate, East, drs ... lb.	.09	.11	.09	.11	.08½	.11
Linoleate, solid, bbls ... lb.	...	.19	...	.19	...	.19
Metal, c-l, NY ... 100 lb.	...	5.90	5.70	5.90	4.90	5.70
Nitrate, 500 lb bbls, wks lb.	.11	.14	.11	.14	.11	.14
Oleate, bbls ... lb.	.18½	.20	.18½	.20	.18½	.20
Red, dry, 95% Pb_3O_4, delv ... lb.	...	.08¾	.08	.08¾	.07½	.0815
97% Pb_3O_4, delv ... lb.	...	.086	.084	.086	.0765	.0848
98% Pb_3O_4, delv ... lb.	.0885	.0865	.0865	0885	.08	.0865
Resinate, precip, bbls ... lb.	...	.16½	...	.16½	...	.16½
Stearate, bbls ... lb.	...	.25	...	.25	...	.26
Titanate, bbls, c-l, f.o.b. wks, frt all'd ... lb.	...	.10¼	...	.10¼	.10	.10¼
White, 500 lb bbls, wks, lb.	...	.07½	...	.07½	.07	.07½
Basic sulfate, 500 lb bbls, wks ... lb.	...	.07	.06½	.07	.06¼	.06½
Lime, chemical quicklime, f.o.b. wks, bulk ... ton	7.00	13.00	7.00	13.00	7.00	13.00
Hydrated, f.o.b. wks ... ton	8.50	16.00	8.50	16.00	8.50	16.00
Lime Salts, see Calcium Salts						
Lime, sulfur, dealers, tks gal.	...	.07½	...	.07½	.07½	.11½
drs ... gal.	.10	.14	.10	.14	.11	.16
Linseed Meal, bgs ... ton	...	28.00	23.00	28.00	23.50	37.00
Litharge, coml, delv, bbls lb.	...	.0760	.07	.0760	.06½	.07½
Lithopone, dom, ordinary, delv, bgs ... lb.	...	.0385	...	.0385	...	.036
bbls ... lb.	...	.0410	...	.0410	.03¾	.03¾
Titanated, bgs ... lb.	...	.05¼	...	.05¼	...	.05¼
bbls ... lb.	...	.05½	...	.05½	...	.05½
Logwood, 51°, 600 lb bbls lb.	...	.13	.10½	.13	.10½	.12½
Solid, 50 lb boxes ... lb.	...	.22	.16½	.22	.16½	.20½
Madder, Dutch ... lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbls ton	67.00	75.00	65.00	75.00	58.00	70.00
Magnesium Carb, tech, 70 lb bgs, wks ... lb.	...	.06¼	...	.06¼	...	.06¼
Chloride flake, 375 lb bbls, c-l, wks ... ton	...	32.00	...	32.00	32.00	42.00
Oxide, calc tech, heavy bbls, frt all'd ... lb.	...	.26	...	.26	.25	.30
Light bbls above basis lb.	...	.26	...	.26	.20	.26
USP Heavy, bbls, above basis ... lb.	...	.26	...	.26	.25	.30
Palmitate, bbls ... lb.	.83	nom.	.33	.83	.33	nom.
Silicofluoride, bbls ... lb.	.15	nom.	.11	.15	.11	.11½
Stearate, bbls ... lb.	...	.28	.23	.28	.23	.27
Manganese, acetate, drs ... lb.	...	.26½	...	.26½	...	.26½
Borate, 30%, 200 lb bbls lb.	.15	16	.15	.16	.15	.16
Chloride, bbls ... lb.	.14	nom.	...	.14	...	...
Dioxide, tech (peroxide), paper bgs, c-l ... ton	...	71.50	...	71.50	62.50	70.00
Hydrate, bbls ... lb.	...	.82	...	.82	...	.82
Linoleate, liq, drs ... lb.	.18	.19½	.18	.19½	.18	.19½
solid, precip, bbls ... lb.	...	19	...	.19	...	.19
Resinate, fused, bbls ... lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, drs ... lb.	...	.12	...	.12	...	.12
Sulfate, tech, anhyd, 90-95%, 550 lb drs ... lb.	.10½	.11½	.10½	.11½	.08	.09¾
Mangrove, 55%, 400 lb bbls lb.						
Bark, African ... ton	37.00	38.00	34.00	38.00	30.00	39.50
Mannitol, pure cryst, cs, wks lb.	...	.85	.85	.90	.90	1.00
commercial grd, 250 lb bbls ... lb.	.35	.40	.35	.45	.38	.50
Marble Flour, blk ... ton	12.00	14.00	12.00	14.00	12.00	14.00
Mercury chloride (Calomel) lb.	...	2.70	...	2.70	2.45	2.95
Mercury metal ... 76 lb. flasks	190.00	192.00	167.00	192.00	163.00	228.50
Mesityl Oxide, f.o.b. dest., tks ... lb.	...	.10½	.10½	.15	...	.15
drs, c-l ... lb.	...	.11½	.11½	.16	..	.16
drs, lcl ... lb.	...	.12	.12	.16½	...	.16½
Meta-nitro-aniline ... lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ... lb.	1.05	1.10	1.05	1.10	1.05	1.40
Meta-phenylene diamine 300 lb bbls ... lb.	...	.65	...	.65	...	.65
Meta-toluene-diamine 300 lb bbls ... lb.	...	.70	.65	.70	.65	.67
Methanol, denat, grd, drs, c-l frt all'd ... gal.	...	.45½	.45	.45½	...	.45
tks, frt all'd ... gal.	...	.40	...	.40	...	.40

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Methanol (continued):						
Pure, drs, c-l, frt all'd gal.	...	.35½	...	.35½	.35	.38
tks ....gal.	...	.30	...	.30	.30	.33
95%, tks ....gal.	...	.29	...	.29	.28	.31
97%, tks ....gal.	...	.30	...	.30	.29	.32
Methyl Acetate, tech tks,						
delv ....lb.	.06	.07	.06	.07	.06	.07
55 gal drs, delv ......lb.	.11	.12½	.07	.12½	.07	.08
C.P. 97-99%, tks, delv lb.	.09½	.10½	.09½	.10½	.09½	.10½
55 gal drs, delv .....lb.	.12	.13	.10½	.13	.10½	.11½
Acetone, frt all'd, drs gal. *p*	...	.66	.37½	.66	.41	.44
tks, frt all'd ......gal. *p*	...	.60	.32	.60	.35	.39
Synthetic, frt all'd,						
east of Rocky M.,						
drs ....gal. *p*	...	.51	.37½	.51	.36	.44
tks, frt all'd ...gal.	...	.43	.32	.43	.32	.36
West of Rocky M.,						
frt all'd, drs...gal *p*	...	.53½	.41½	.53½	.41½	.48
tks, frt all'd ..gal. *p*	...	.45½	.35	.45½	.35	.45½
Anthraquinone ....lb.	...	.83	...	.83	...	.83
Butyl Ketone, tks ......lb.	...	.10½	...	.10½	...	.10½
Cellulose, 100 lb lots,						
frt all'd ....lb.	...	.55	...	.55	.55	.70
less than 100 lbs. f.o.b.						
wks ....lb.	...	.60	...	.60	.60	.75
Chloride, 90 lb. cyl ....lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone, tks, frt all'd lb.	...	.07½	.06	.07½	.05½	.06
50 gal drs, frt all'd, c-l lb.	...	.08½	.07	.08½	.06½	.07½
Formate, drs, frt all'd ..lb.	...	.89	...	.89	...	.89
Hexyl, Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt all'd ..lb.	...	.80	...	.80	...	.80
Mica, dry grd, bgs, wks..ton	...	30.00	...	30.00	...	30.00
Michler's Ketone, kgs ....lb.	...	2.50	...	2.50	...	2.50
Mixed Amylnaphthalenes						
mixed, ref., l-c-l, drs, f.o.b.						
wks ....lb.	...	.16	.16	.19	...	...
crude ....lb.	...	.14	.14	.15	...	...
Monoamylamine,c-l,drs,wks lb.	...	.50	.50	.52	...	.52
lcl, drs, wks ....lb.	...	.53	...	.55	...	.55
Monoamylnaphthalene, l-c-l,						
drs, f.o.b. wks .... lb	...	.17	.17	.20	...	...
Monobutylamine, drs	...	.37	...	.37	...	...
c-l, wks .... lb	...	.40	...	.40	...	.50
lcl, wks ....lb.	...	.48	...	.48	...	.48
Monochlorobenzene, see "C"						
Monoethanolamine, tks, wks, lb.	...	.23	...	.23	...	.23
Monoethylamine (100% basis)						
lcl, drs, f.o.b. wks .....lb.	...	.35	.35	.65	...	.65
Monomethylamine, drs, frt						
all'd, E. Mississippi, c-l lb.	...	.65	...	.65	...	.65
Monomethylparamiosulfate,						
100 lb drs ....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Morpholine, drs 55 gal,						
wks ....lb.	...	.67	...	.67	...	.75
Myrobalans 25%, liq bbls lb.	no prices		no prices		no prices	
50% Solid, 50 lb boxes lb.	no prices		no prices		no prices	
J1 bgs ....ton	no prices		35.00	48.00	28.50	40.00
J2 bgs ....ton	no prices		28.00	39.00	23.00	34.00
Naphtha, v.m.&p. (deodorized)						
see petroleum solvents.						
Naphtha, Solvent, water-						
white, tks ....gal.	...	.26	...	.26	.26	.27
drs, c-l ....gal.	...	.31	...	.31	.31	.32
Naphthalene, dom, crude bgs,						
wks .... lb. *q*	2.25	2.50	2.25	2.50	2.25	2.75
imported, cif, bgs ....lb.	no prices		no prices		...	3.00
Balls, flakes, pks ......lb.	...	.08	.06¼	.08	.06¼	.07¾
Balls, ref'd bbls, wks...lb.	...	.08	.07	.08	.06¾	.07
Flakes, re'd, bbls, wks lb.	...	.08	.07	.08	.06¾	.07
Nickel Carbonate, bbls ...lb.	.36	.36½	.36	.36½	.36	.36½
Chloride, bbls ....lb.	.18	.20	.18	.20	.18	.20
Metal ingot ....lb.	.35	.36	.34	.36	.34	.35
Oxide, 100 lb kgs, NY lb.	.35	.38	.35	.38	.35	.38
Salt, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, sulfate, 40%, drs,						
55 lb drs ....lb.	...	.703	...	.703	...	.70
Nitre Cake, blk ....ton	...	16.00	...	16.00	...	16.00
Nitrobenzene redistilled, 1000						
lb drs, wks ....lb.	.08	.09	.08	.09	.08	.10
tks ....lb.	...	.07	...	.07	...	.07
Nitrocellulose, c-l, lcl, wks lb.	.20	.29	.20	.29	.20	.29
Nitrogen Sol. 45½% ammon,						
f.o.b. Atlantic & Gulf ports,						
tks, unit ton, N basis	...	1.2158	...	1.2158	...	1.2158
Nitrogenous Mat'l, bgs imp unit	no prices		no prices		2.20	2.60
dom, Eastern wks ....unit	2.25	3.00	2.20	3.00	2.20	2.90
dom, Western wks ....unit	2.25	nom.	1.75	2.25	1.95	2.00
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs ....lb.	no prices		.26	.29	.28	.30
Oak Bark Extract, 25%, bbls lb.	.03½	.03¾	.03⅛	.03¾	.03⅛	.03⅜
tks ....lb.	...	.03	.02¾	.03	...	.02¾
Octyl Acetate, tks, wks ..lb.	...	.15	...	.15	...	.15
Orange-Mineral, 1100 lb cks						
NY ....lb.	...	.11½	.11	.11½	.10½	.13½
Orthoaminophenol, 50 lb kgs lb.	2.15	2.25	2.15	2.25	2.15	2.25
Ortho amyl phenol, l-c-l, drs,						
f.o.b. wks ....lb.	...	.15	...	.15	...	...
Orthoanisidine, 100 lb drs lb.	...	.70	...	.70	.70	.74
Orthochlorophenol, drs ...lb.	...	.32	...	.32	...	.32
Orthocresol, 30.4°, drs, wks lb.	.17	.17½	.16	.17½	.16	.16½
Orthodichlorobenzene, 1000						
lb drs ....lb.	.06	.07	.06	.07	.06	.07
Orthonitrochlorobenzene, 1200						
lb drs, wks ....lb.	.15	.18	.15	.18	.15	.18

a Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila., or N. Y.

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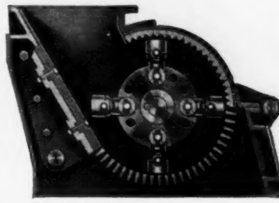

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NEW HAVEN, CONN.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Orthonitroparachlorphenol, tins ....lb.	...	.75	...	.75	...	.75
Orthonitrophenol, 350 lb drs ....lb.	.85	.90	.85	.90	.85	.90
Orthonitrotoluene, 1000 lb drs, wks ....lb.	...	.09	...	.09	...	.09
Orthotoluidine, 350 lb bbls, lcl ....lb.	...	.19	...	.19	...	.19
Osage Orange, cryst, bbls lb.	...	.21	...	.21	...	.21
51° liquid ....lb.	...	.10	...	.10	...	.10
Paraffin, rfd, 200 lb bgs						
122-127° M P ....lb.	...	.057	...	.057	.02¼	.0675
128-132° M P ....lb.	.057	.0595	.057	.0595	.057	.0705
133-137° M P ....lb.	.06¼	.06½	.06¼	.06½	.06¼	.0755
Para aldehyde, 99%, tech, 55-110 gal drs, wks ..lb.	...	.12	.10	.12	.10	.11¼
Aminoacetanilid, 100 lb kgs ....lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs ....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs ....lb.	...	.32	...	.32	...	.32
Dichlorobenzene 200 lb drs, wks ....lb.	.11	.12	.11	.12	.11	.12
Formaldehyde, drs, wks lb.	.23	.24	.23	.24	.34	.35
Nitroacetanilid, 300 lb bbls ....lb	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ....lb.	...	.45	...	.45	.45	.47
Nitrochlorobenzene, 1200 lb drs, wks ....lb.	...	.15	...	.15	.15	.16
Nitro-orthotoluidine, 300 lb bbls ....lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	...	.35	...	.35	.35	.37
Nitrosodimethylaniline, 120 lb bbls ....lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	...	.30	...	.30	...	.30
Phenylenediamine, 350 lb bbls ....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls ....lb.	...	.70	...	.70	.70	.75
tks, wks ....lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks ....lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ....lb.	...	.48	...	.48	.48	.50
Paris Green, dealers, drs lb.	.24	.26	.23	.25	.23	.26
Pentane, normal, 28-38° C, group, 3 tks ....gal.	...	.08½	...	.08½	...	.08½
drs, group 3 ....gal.	.11½	.16	.11½	.16	.11½	.16
Perchlorethylene, 10 lb drs, frt all'd ....lb.	.08	.08½	.08	.08½	.08	.08¼
Petrolatum, dark amber, bbls ....lb.	...	.03½	.02¾	.03½	.02¾	.05
White, lily, bbls ....lb.	...	.05¾	.04¾	.05¾	.04¾	.08½
White, snow, bbls ....lb.	...	.06½	.05½	.06½	.05½	.09½
Petroleum Ether, 30-60°, group 3, tks ....gal.	...	.13½	...	.13½	...	.13½
drs, group 3 ....gal.	...	.14½	...	.14½	.14½	.25½
PETROLEUM SOLVENTS AND DILUENTS						
Cleaners naphthas, group 3, tks ,wks ....gal.	.07⅛	.06¾	.07⅛	.07	.06⅞	.07
East Coast, tks, wks gal.	.10	.09	.10	.10½	.09	.10½
Lacquer diluents, tks						
East Coast ....gal.	...	.10½	.09½	.10½	.09½	.10
Group 3, tks ....gal.	.07⅜	.08⅛	.06¼	.08⅛	.07⅜	.07⅞
Naphtha, V.M.P., East tks, wks ....gal.	.11	...	.09	.11	.09½	.10
Group 3, tks, wks ...gal.	.07⅛	...	.06	.07⅛	.06⅜	.07⅞
Petroleum thinner, 43-47, East, tks, wks ....gal.	.08¾	.09½	.08¾	.09½	.08¾	.09½
Group 3, tks, wks ..gal.	.06	.07	.05⅞	.07	.05⅞	.07
Rubber Solvents, stand grd, East, tks, wks ..gal.	...	.10	.09½	.10	.09½	.10
Group 3, tks, wks ..gal.	...	.07⅛	.06	.07⅛	.06⅜	.07⅞
Stoddard Solvents, East, tks, wks ....gal.	...	.09	.083	.09½	.08¾	.09½
Group 3, wks ....gal.	...	.06⅝	.05½	.06⅝	.06⅜	.06½
Phenol, 250-100 lb drs ....lb.	.12½	...	.12	.13¾	.12	.14¾
tks, wks ....lb.	...	.11½	.11	.11½	.11	.12
Phenyl-Alpha-Naphthylamine, 100 lb kgs ....lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs ....lb.	...	.17	...	.17	...	.17
Phenylhydrazine Hydrochloride, com ....lb.	...	1.50	...	1.50	...	1.50
Phloroglucinol, tech, tins lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tons ....lb.	20.00	22.00	20.00	22.00	20.00	22.00
Phosphate Rock, f.o.b. mines						
70% basis ....ton	2.30	2.40	2.15	2.40	1.85	1.90
72% basis ....ton	2.75	3.00	2.50	3.00	2.15	2.35
Florida Pebble, 68% basis ton	no prices		...	1.90	1.90	2.85
75-74% basis ....ton	no prices		...	2.90	2.90	3.85
Tennessee, 72% basis ..ton	...	4.50	...	4.50	...	4.50
Phosphorus Oxychloride 175 lb cyl ....lb.	.15	.18	.15	.18	.15	.20
Red, 110 lb cases ....lb.	.40	.44	.40	.44	.40	.44
Sesquisulfide, 100 lb cs ..lb.	.38	.42	.38	.42	.38	.44
Trichloride, cyl ....lb.	.15	.16	.15	.16	.15	.18
Yellow, 110 lb cs, wks lb.	.18	.20	.18	.20	.18	.20
Phthalic Anhydride, ,100 lb drs, wks ....lb.	.14½	.15½	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist ....lb.	...	.65	.50	.65	.53	.56
Steam dist wat wh bbls gal.	.61	.65	.59	.65	...	.59
tks ....gal.	...	.54		.54		.54
Pitch Hardwood, wks ...ton	23.75	24.00	23.75	24.00	23.75	24.00
Coaltar, bbls, wks ....ton	19.00	22.00	19.00	22.00	...	19.00

Current

Pitch, Burgundy
Rosins

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Pitch (continued)						
Burgundy, dom, bbls, wks lb.	.06	.06½	.06	.06½	.05½	06½
Imported ....lb.	no prices		no prices		no prices	
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls ....bbl.	6.00	6.50	6.00	6.50	6.00	6.50
Polyamylnaphthalene, l-c-l, drs, f.o.b. wks ....lb.	...	.25	.25	.30	...	...
Potash, Caustic, wks, sol ..lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake ....lb.	...	.07	...	.07	.07	.07½
liquid, tks ....lb.	...	.02⅞	...	.02⅞	.02⅞	.03¾
Manure Salts, Dom 30% basis, blk .....unit	...	.60	...	.60	.53½	.58½
Potassium Abietate, bbls ..lb.	...	.08	...	.08	.08	.09
Acetate, tech, bbls, delv lb.	...	.28	.26	.28	...	.26
Bicarbonate, USP, 320 lb bbls ....lb.	...	.15	.15	.17	...	.18
Bichromate Crystals, 725 lb cks* ....lb.	.09⅝	...	.08⅞	.09⅝	.08¾	.09¼
Binoxalate, 30 lb bbls ..lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs ...lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks ....lb.	.06½	.06¾	.06½	.06¾	.06½	.07
liquid, tks ....lb.	...	.0275	...	.0275	.0275	.03
drs, wks ....lb.	.03	.03⅛	.03	.03⅛	.03	.03½
Chlorate crys, 112 lb kgs, wks ....lb.	nom.	.11	...	.11	.10½	.13
gran, kgs ....lb.	.12	.14½	.12	.14½	.12	.14½
powd, kgs ....lb.	.09½	.10	.09½	.10	.10	.12½
Chloride, crys, bbls ....lb.	.08	nom.	.04	.08	.04	.04¼
Chromate, kgs ....lb.	.24	.27	.24	.27	.24	.27
Cyanide, drs ....lb.	...	.55	...	.55	.55	.75
Iodide, 250 lb bbls .....lb.	1.35	1.38	1.35	1.38	...	1.35
Metabisulfite, 300 lb bbls lb.	nom.	.21	nom.	.21	.13	.19
Muriate, bgs, dom, blk unit	.56	.58	.53½	.58	...	.53½
Oxalate, bbls ....lb.	.28	.30	.25	.30	.25	.26
Perchlorate, kgs, wks ..lb.	.09½	.11	.09½	.11	.09½	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.20½	.21	.19¼	.21	.18½	.20⅘
Prussiate, red, bbls ....lb.	no prices		no prices		.38	.45
Yellow, bbls ....lb.	.17	.19	.16	.19	.15	.18
Sulfate, 90% basis, bgs ton	...	36.25	...	36.25	34.25	36.25
Titanium Oxalate, 200 lb bbls ....lb.	...	.40	...	.40	.40	.45
Pot & Mag Sulfate, 48% basis bgs ....ton	...	27.00	...	27.00	24.75	27.00
Propane, group 3, tks ....lb.	.03¾	.04	.03¾	.04	.03	.04⅜
Putty, com'l, tubs ....100 lb.	...	3.15	...	3.15	...	6.00
Linseed Oil, kgs ....100 lb.	...	5.00	...	5.00	...	4.50
Pyrethrum, conc liq:						
2.4% pyrethrins, drs, frt all'd ....gal.	4.40	4.60	4.40	4.95	4.75	7.50
3.6% pyrethrins, drs, frt all'd ....gal.	6.60	7.20	6.60	7.20	7.20	11.00
Flowers, coarse, Japan, bgs ....lb.	.20	.21	.20	.25	.23	.36
Fine powd, bbls ......lb.	.21	.22	.21	.26	.25	.37
Pyridine, denat, 50 gal drs gal.	...	1.71	...	1.71	...	1.71
Refined, drs ....lb.	...	.48	...	.48	...	.51
Pyrites, Spanish cif Atlantic ports, blk ....unit	no prices		no prices		.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.40	2.15	2.40	2.15	2.40
Quebracho, 35% liq tks ..lb.	...	.05½	.03¾	.05½	.03¼	.03¾
450 lb bbls, c-l ......lb.	...	.05	.04¼	.05	.04	.04¼
Solid, 63%, 100 lb bales cif ....lb.	...	.04⅞		.04⅞	.04½	.04⅞
Clarified, 64% bales ..lb.	...	.05	.05	.05⅛	.04¾	.05⅛
Quercitron, 51 deg liq, 450 lb. bbls ....lb.	.08½	.09½	.08½	.09½	.08½	.09½
Solid, drs ....lb.	.11	.16½	.11	.16½	.10	.16½
R Salt, 250 lb bbls, wks lb.	...	.55	...	.55	...	.55
Resorcinol, tech, cans ....lb.	.68	.74	.68	.74	.75	.80
Rochelle Salt, cryst ......lb.	.39½	...	.32½	.39½	.22¼	.29¾
Powd, bbls ....lb.	.38½	...	.31½	.38½	.21¼	.28¾
Rosin Oil, bbls, first run gal.	...	.48	.40	.50	...	.50
Second run ....gal.	...	.50	.42	.56	.52	.56
Third run, drs ....gal.	...	.54	.46	.57	.56	.57
Resins 600 lb bbls, 100 lb unit ex. yard NY:**						
B	...	3.02	2.06	3.02	1.80	2.45
D	...	3.03	2.08	3.03	1.87	2.48
E	...	3.03	2.07	3.03	1.95	2.51
F	...	3.03	2.08	3.03	2.10	2.51
G	...	3.03	2.18	3.03	2.10	2.48
H	...	3.03	2.27	3.03	2.10	2.48
I	...	3.05	2.26	3.05	2.10	2.54
K	...	3.05	2.36	3.05	2.12	2.75
M	...	3.16	2.38	3.16	2.20	2.81
N	...	3.16	2.47	3.16	2.39	2.85
WG	...	3.20	2.79	3.20	2.68	3.17
WW	...	3.48	3.05	3.48	3.00	3.40
X	...	4.40	3.10	4.40	...	...
Rosins, Gum, Savannah (280 lb. unit):**						
B	...	2.47	1.31	2.92	1.15	1.80
D	...	2.48	1.51	2.96	1.22	1.83
E	...	2.48	1.60	2.96	1.30	1.86
F	...	2.48	1.62	2.96	1.45	1.86
G	...	2.48	1.60	2.96	1.45	1.83
H	...	2.48	1.63	2.97	1.45	1.83
I	...	2.48	...	2.98	1.45	1.89
K	...	2.53	1.84	3.00	1.47	2.10
M	...	2.62	2.01	3.03	1.55	2.16

* Spot price is ⅛c higher. ** Jan. 24, 1941, high and low based on 280 lb. unit.

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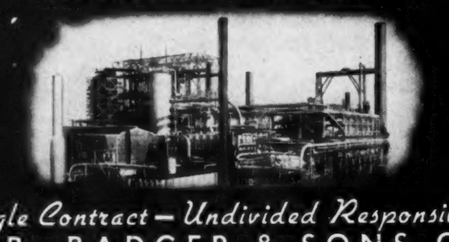
(INCORPORATED)
75 East 45th St., New York City
Deposits and Plants: Newgulf and Long Point, Texas

9-TG-7

COMPLETE PROCESSING PLANTS
INCLUDING POWER AND YARD FACILITIES
PROCESSING EQUIPMENT



Single Contract — Undivided Responsibility
E. B. BADGER & SONS CO.
Boston, Mass.
New York Philadelphia San Francisco London Paris

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Rosins (continued):						
N	...	2.65	2.65	3.03	1.70	2.20
WG	...	2.76	2.76	3.10	2.03	2.52
WW	...	2.96	2.96	3.46	2.25	2.75
X	...	2.96	2.96	3.40	2.35	2.75
Rosin, Wood, c-l, FF grade, NY	1.70	2.00	1.40	2.00	1.40	1.54
Rotten Stone, bgs mines ton	25.50	37.50	25.50	37.50	25.50	37.50
Imported, lump, bbls ... lb.	no prices		no prices		...	.14
Powdered, bbls ...... lb.	no prices		no prices		.08½	.10
Sago Flour, 150 lb bgs .. lb.	.05	.05½	.03½	.05½	.04	.04½
Sal Soda, bbls wks ... 100 lb.	...	1.20	...	1.20	...	1.20
Salt Cake, 94-96%, c-l, bulk wks .... ton	13.00	nom.	13.00	17.00	...	17.00
Chrome, c-l, wks ...... ton	...	16.00	...	16.00	11.00	16.00
Saltpetre, gran, 450-500 lb bbls .... lb.	...	.081	.076	.081	.071	.08
Cryst, bbls .... lb.	...	.091	.086	.091	.081	.08¾
Powd, bbls .... lb.	...	.091	.086	.091	.081	.10
Satin, White, pulp, 550 lb bbls .... lb.	.01¼	.01½	.01¼	.01½	.01¼	.01½
Schaeffer's Salt, kgs ..... lb.	...	46	...	.46	.46	.48
Shellac, Bone dry, bbls .. lb. s	.35	.36	.26	.36	.23	.27
Garnet, bgs .... lb.	.30	.31	.20	.31	.18½	.23
Superfine, bgs .... lb. s	.29	.30	.16½	.30	.14½	.20½
T. N., bgs .... lb. s	.28½	.29	.16	.29	.13½	.19½
Silver Nitrate, vials ..... oz.	...	.24	.24	.26⅞	.26¾	.27⅜
Slate Flour, bgs, wks .... ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks .... 100 lb.	...	1.10	...	1.10	...	1.10
58% light, bgs ..... 100 lb.	1.05	1.08	1.05	1.08	1.05	1.08
blk .... 100 lb.	...	.90	...	.90	...	.90
paper bgs .... 100 lb.	1.05	1.08	1.05	1.08	1.05	1.08
bbls .... 100 lb.	...	1.35	1.35	1.45	1.35	1.45
Caustic, 76% grnd & flake, drs .... 100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs ..... 100 lb.	...	2.30	...	2.30	...	2.30
Liquid sellers, tks .. 100 lb.	...	2.00	...	2.00	1.95	1.97½
SODIUM						
Sodium Abietate, drs ..... lb.	...	.11	...	.11	...	.11
Acetate, 60% tech, gran, powd, flake, 450 lb bbls wks .... lb.	.04½	.05	.04	.06	.04	.05
90%, bbls, 275 lb delv lb.	.06½	.07	.06	.07	.06	.06¾
anhyd, drs, delv ..... lb.	.08½	.10	.08¼	.10	.08¼	.10
Alginate, drs .... lb.	.39	.70	.39	.70	.39	.96
Antimoniate, bbls ...... lb.	.15	.15½	.14	.15½	.14½	.15
Arsenate, drs .... lb.	.08	...	.07	.08¾	.07	.08¾
Arsenite, liq, drs ..... gal.	...	.35	...	.35	...	.35
Dry, gray, drs, wks .. lb.	...	.06¾	.06½	.09¼	.06½	.09½
Benzoate, USP kgs .... lb.	.46	.50	.46	.50	.46	.52
Bicarb, powd, 400 lb bbl, wks .... 100 lb.	...	1.70	...	1.70	1.70	1.85
Bichromate, 500 lb cks, wks* .... lb.	...	.07⅜	.06⅞	.07½	.06¼	.07¼
Bisulfite, 500 lb bbls, wks lb.	.03	.031	.03	.031	.03	.031
35-40% sol bbls, wks 100 lb.	1.40	1.80	1.40	1.80	1.30	1.80
Chlorate, bgs, wks ..... lb.	...	.06¼	...	.06¼	.06¼	.08½
Cyanide, 96-98%, 100 & 250 lb drs, wks ...... lb.	.14	.15	.14	.15	.14	.15
Diacetate, 33-35% acid, bbls, lcl, delv .... lb.	...	.10	.09	.10	.08½	.09
Fluoride, white 90%, 300 lb bbls, wks .... lb.	...	.08	.07	.08	.07	.08
Hydrosulfite, 200 lb bbls, f.o.b. wks .... lb.	.17	.18	.17	.18	.16	.17
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	...	2.80	...	2.80	2.80	3.05
Tech, reg cryst, 375 lb bbls, wks .... 100 lb.	2.45	...	2.45	...	2.45	2.80
Iodide, jars .... lb.	...	2.42	...	2.42	2.30	2.42
Metanilate, 150 lb bbls .. lb.	.41	nom.	.41	nom.	.41	.42
Metasilicate, gran, c-l, wks .... 100 lb.	...	2.35	...	2.35	...	2.35
cryst, drs, c-l, wks 100 lb.	...	3.05	...	3.05	...	3.05
Anhydrous, wks, cl, drs .... 100 lb.	...	3.75	...	3.75	3.75	3.75
wks, lcl, drs, .. 100 lb.	5.05	5.05	5.05	5.05	5.05	5.05
Monohydrated, bbls .... lb.	...	.026	.023	.026	...	.023
Naphthenate, drs ...... lb.	.12	.19	.12	.19	.12	.19
Naphthionate, 300 lb bbl lb.	...	.50	...	.50	...	.50
Nitrate, 92% crude, 200 lb. bgs, c-l, NY .... ton	...	28.70	...	28.70	...	28.30
100 bgs, same basis .. ton	...	29.40	...	29.40	...	29.00
Bulk .... ton	...	27.00	...	27.00	...	27.00
Nitrite, 500 lb bbls .... lb.	.06¾	...	.06¾	.11½	.06¾	.11½
Othochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25	.27	.25	.27	.25	.27
Orthosilicate, 300 lb drs, c-l .... lb.	...	.03	...	.03	...	.03
Perborate, drs, 400 lb .. lb.	.14¾	...	.14¾	.15¼	.14¾	.15¼
Peroxide, bbls, 400 lb .. lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	2.40	2.90	2,30	2.90	...	2.30
bgs, wks .... 100 lb.	2.20	2.70	2.10	2.70	...	2.10
Tri-sodium, tech, 325 lb bbls, wks ...... 100 lb.	2.55	3.05	2.45	3.05	...	2.45
bgs, wks .... 100 lb.	2.35	2.85	2.25	2.85	...	2.25
Picramate, 160 lb kgs .. lb.	...	.65	...	.65	.65	.67
Prussiate, Yellow, 350 lb bbls, wks .... lb.	.10½	...	.10½	.10¾	.09½	.10¾
Pyrophosphate, anhyd, 100 lb bbls f.o.b. wks frt eq lb.	...	.0510	.0510	.0515	...	.0530

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; s T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Sodium (continued):						
Sesquisilicate, drs, c-l, wks ... 100 lb.	...	2.90	...	2.90	2.00	2.90
Silicate, 60°, 55 gal drs, wks ... 100 lb.	no prices		1.40	1.80	1.40	1.80
40°, 55 gal drs, wks 100 lb	...	.80	...	.80	...	.80
tks, wks ... 100 lb.	no prices		...	.65	...	.65
Silicofluoride, 450 lb bbls NY ... lb.	.12	.15	.09¾	.15	...	...
Stannate, 100 lb drs ... lb.	.33½	.36½	.32½	.37	.31½	.35½
Stearate, bbls ... lb.	.19	.24	.19	.24	.19	.24
Sulfanilate, 400 lb bbls lb.	.16	.18	.16	.18	.16	.18
Sulfate, Anhyd, 550 lb bgs c-l, wks ... 100 lb. ‡	1.70	1.90	1.45	1.90	1.45	1.90
Sulfide, 80% cryst, 440 lb. bbls, wks ... lb.	.02¼	...	.02¼	.03	.02¼	.03
Solid, 650 lb drs, c-l, wks ... lb.	.03	...	.03	.03¾	.03	.03¾
Sulfite, powd, 400 lb bbls wks ... lb.	...	.05¼	...	.05¼	.023	.05¼
Sulfocyanide, drs ... lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls ... lb.	...	.12	...	.12	...	.12
Supersilicate (see sodium sesquisilicate)						
Tungstate, tech, crys, kgs lb.	no prices		no prices		no prices	
Sorbitol, com, solut, wks c-l, drs, wks ... lb.	...	.14¾	...	.14¾	.14¾	.16
Spruce, Extract, ord, tks ... lb.	...	.01¼	.01⅛	.01¼	...	.01⅛
Ordinary, bbls ... lb.	...	.01¾	.01⅝	.01¾	...	.01⅝
Super spruce ext, tks ... lb.	...	.01½	.01⅜	.01½	...	.01⅜
Super spruce ext, bbls ... lb.	...	.02	.01⅞	.02	...	.01⅞
Super spruce ext, powd, bgs ... lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	...	3.10	2.90	3.10	2.50	2.95
Powd, 140 lb bgs ... 100 lb.	...	3.20	3.05	3.80	2.60	3.05
Potato, 200 lb bgs ... lb.	.0585	...	.04½	.0585	.05	.07½
Imp, bgs ... lb.	no prices		no prices		...	.06½
Rice, 200 lb bbls ... lb.	.08½	.09½	.07½	.09½	.07¼	.08½
Sweet Potato, 240 lb bbls, f.o.b. plant ... 100 lb.	nom.	7.00	nom.	7.00	5.50	7.00
Wheat, thick, bgs ... lb.	...	.05	...	.05	.05¼	.05½
Strontium, carbonate, 600 lb bbls, wks ... lb.	no prices		no prices		.22	.23
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
Sucrose, octa-acetate, den, grd, bbls, wks ... lb.	...	.45	...	.45	...	.45
tech, bbls, wks ... lb.	...	.40	...	.40	...	.40
SULFUR						
Sulfur, crude, f.o.b. mines ton	...	16.00	...	16.00	...	16.00
Flour, com'l, bgs ... 100 lb.	1.40	1.95	1.40	1.95	1.40	2.35
bbls ... 100 lb.	1.95	2.50	1.95	2.50	1.95	2.70
Rubbermakers, bgs ... 100 lb.	...	2.00	...	2.00	2.00	2.80
bbls ... 100 lb.	...	2.35	...	2.35	2.35	3.15
Extra fine, bgs ... 100 lb.	...	2.35	...	2.35	2.85	3.00
Superfine, bgs ... 100 lb.	2.65	2.80	2.65	2.80	2.65	2.80
bbls ... 100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ... 100 lb.	2.80	3.35	2.80	3.35	2.80	3.75
bbls ... 100 lb.	3.15	3.70	3.15	3.70	3.15	4.10
Roll, bgs ... 100 lb.	2.15	2.70	2.15	2.70	2.15	3.10
bbls ... 100 lb.	2.30	2.85	2.30	2.85	2.50	3.25
Sulfur Chloride, 700 lb drs, wks ... lb.	.03	.08	.03	.08	.03	.08
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.07	.09
Multiple units, wks ... lb.	.04½	.07	.04½	.07	.04½	.07
tks, wks ... lb.	.04	.06	.04	.06	.04	.06
Refrigeration, cyl, wks lb.	.16	.40	.16	.40	.16	.40
Mutiple units, wks ... lb.	.07½	.10	.07½	.10	.07½	.10
Sulfuryl Chloride ... lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd ... ton	no prices		no prices		98.00	140.00
Extract, 42°, bbls ... lb.	.08	.06¼	.06	.08	.06	.06¼
Superphosphate, 16% bulk, wks ... ton	...	10.00	8.50	10.00	8.50	9.00
Run of pile ... ton	...	9.50	8.00	9.50	8.00	8.50
Triple, 40-48%, a.p.a. bulk, wks, Balt. unit ... ton	no prices		...	.68	.68	.70
Talc, Crude, 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	15.00
Ref'd 100 lb bgs, NY ton	17.25	19.25	17.25	19.25	14.00	17.25
French, 220 lb bgs, NY ton	no prices		no prices		23.00	35.00
Ref'd, white bgs, NY ton	no prices		no prices		45.00	60.00
Italian, 220 lb bgs to arr ton	no prices		no prices		64.00	70.00
Ref'd, white bgs,, NY ton	no prices		no prices		65.00	78.00
Tankage, Grd, NY ... unit ॥	...	3.85	2.35	3.85	2.35	3.25
Ungrd ... unit ॥	...	4.60	2.35	4.60	2.35	3.25
Fert grade, f.o.b. Chgo unit ॥	...	4.85	2.35	4.85	2.40	3.50
South American cif unit ॥	...	4.50	2.60	4.50	2.50	3.50
Tapioca Flour, high grade, bgs ... lb.	.05¼	.06½	.03	.06½	.02¾	.05
Tar Acid Oil, 15%, drs ... gal.	.22	.24	.22	.24	.22	.24
25% drs ... gal.	.25	.27	.25	.27	.25	.28
Tar, pine, delv, drs ... gal.	.26	.27	.26	.27	.26	.27
tks, delv, E. cities ... gal.	...	.21	...	.21	...	.21
Tartar Emetic, tech, bbls lb.	...	.44¾	.36¾	.44¾	.34¾	.36¾
USP, bbls ... lb.	...	.50	.42	.50	.40	.42
Terpineol, den grade, drs lb.	...	.17	...	.17	...	.17
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachlorethylene, drs, tech lb.	.08	.09	.08	.09	.08	.09½
Tetralene 50 gal drs, wks lb.	...	.19	...	.19	.12	.18
Thiocarbanilid, 170 lb bbls lb.	...	.24	...	.24	.20	.25
Tin, crystals, 500 lb. bbls, wks lb.	.39	.39½	.38	.40	.36	.40½
Metal, NY ... lb.	* ...	.52	.501	.52¾	.45½	.55
Oxide, bbls, wks lb.	.55	.57	.54	.56	.51	.56
Tetrachloride, 100 lb drs, wks ... lb.	...	.31	.25¼	.31	.23	.26½
Titanium Dioxide, 300 lb bbls lb.	...	.14¾	.13¾	.14¾	.13	.16
Barium Pigment, bbls ... lb.	.05¾	.06½	.05¾	.06½	.05¼	.06½
Calcium Pigment, bbls lb.	.05½	.05¾	.05½	.05¾	.05	.06¼

‡ Bags 15c lower; ॥ + 10; * Aug. 29.

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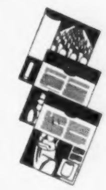

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HENRY BOWER CHEMICAL

MANUFACTURING COMPANY

29th & GRAY'S FERRY ROAD PHILADELPHIA, PA.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Titanium tetrachloride, drs, f.o.b. Niagara Falls ....lb.	.32	.45	.32	.45	.32	.45
Titanium trichloride 23% sol, bbls f.o.b. Niagara Falls lb.	.22	.26	.22	.26	.22	.26
20% solution, bbls .....lb.	.175	.215	.175	.215	.175	.215
Toluidine, mixed, 900 lb drs, wks ....lb.	...	.26	...	.26	.26	.27
Toluol, 110 gal drs, wks gal.	...	.32	...	.32	.27	.32
8000 gal tks, frt all'd gal.	...	.27	...	.27	.22	.27
Toner Lithol, red, bbls ...lb.	.55	.60	.55	.60	.55	.60
Para, red, bbls ....lb.	.70	.75	.70	.75	.70	.75
Toluidine, bgs ....lb.	...	1.05	...	1.05	1.05	1.35
Triacetin, 50 gal drs, wks, lb.	...	.26	...	.26	...	.26
Triamyl Borate, lcl, drs, wks, lb.	...	.27	...	.27	...	.27
Triamylamine, drs, lcl, wks, drs ....lb.	...	.90	...	.90	.78	.90
Tributylamine, lcl, drs, f.o.b. wks ....lb.	...	.70	...	.70	.67	.70
Tributyl citrate, drs, frt all'd lb.	.24	...	.24	.26	.24	.35
Tributyl Phosphate, frt all'd lb.	...	.42	...	.42	...	.42
Trichlorethylene, 600 lb drs, frt all'd E. Rocky Mts lb.	.08	...	.08	.09	.08	.09
Tricresyl phosphate, tech, drs lb.	.25	...	.22	.36½	.22	.36½
Triethanolamine, 50 gal drs, wks ....lb.	...	.19	...	.19	.19	.22
tks, wks ....lb.	...	.18	...	.18	.18	.20
Triethylamine, lcl, drs, f.o.b. wks ....lb.	...	1.05	...	1.05	...	1.05
Triethylene glycol, drs, wks lb.	...	.26	...	.26	...	.26
Trihydroxyethylamine Oleate, bbls ....lb.	...	.30	...	.30	...	.30
Stearate bbls ....lb.	...	.30	...	.30	...	.30
Trimethyl Phosphate, drs, lcl, f.o.b. dest ....lb.	...	.50	...	.50	...	.50
Trimethylamine, c-l, drs, frt all'd E. Mississippi ....lb.	...	.90	.90	1.00	...	1.00
Triphenylguanidine ....lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs ..lb.	...	.38	...	.38	...	.38
Tripoli, airfloated, bgs, wks ton	...	26.00	...	26.00	26.00	30.00
Turpentine (Spirits), c-l, NY dock, bbls ....gal.	...	.75½	.45	.75½	.32½	.40
Savannah, bbls ....gal.	...	.67¼	.33½	.67¼	.26½	.34
Wood Steam dist, drs, c--lcl, NY ....gal.	...	.68	.35	.68	.27	.34½
Wood, dest dist, cl-lcl, drs, delv E. cities ....gal.	.58	.60	.35	.60	.25	.32
Urea, pure 112 lb cases ..lb.	...	.12	...	.12	.12	.15½
Fert grade, bgs, c. i. f. S.A. points ....ton	no prices		no prices		...	110.00
Dom f.o.b., wks ....ton	...	85.00	...	85.00	85.00	101.00
Urea Ammonia, liq., nitrogen basis ....ton	...	121.58	...	121.58	...	121.50
Valonia beard, 42%, tannin bgs ....ton	no prices		no prices		47.00	56.00
Cups, 32% tannin bgs..ton	no prices		no prices		33.00	39.00
Extract, powd, 63% ...lb.	no prices		no prices		.0565	.06
Vanillin, ex eugenol, 25 lb tins, 2000 lb lots .....lb.	...	2.60	..	2.60	...	2.60
Ex-guaiacol ....lb.	...	2.30	2.30	2.50	...	2.50
Ex-lignin ....lb.	...	2.55	2.50	2.55	...	2.50
Vermilion, English, kgs ..lb.	3.12	3.17	3.12	3.17	...	2.76
Wattle Bark, bgs ....ton	41.00	43.30	37.50	43.00	34.00	38.75
Extract, 60°, tks, bbls..lb.	.04	.0475	.03⅞	.0475	.03⅞	.04¼
Wax, Bayberry, bgs ......lb.	.18	.20	.18	.20	.25	.30
Bees, bleached, white 500 lb slabs, cases ....lb.	.47	.50	.36½	.50	.35	.38
Yellow, African, bgs..lb.	no stocks		...	.30	.23	.29
Brazilian, bgs .....lb.	no stocks		.31	.32	.24	.31
Refined, 500 lb slabs, cases lb.	.42	.43	.35	.43	.29	.36
Candelilla, bgs ....lb.	nom.	.32	.19	.32	.18	.19
Carnauba, No. 1, yellow, bgs ....lb.	.82	.84	.68	.86	.58	.85
No. 2, yellow, bgs ...lb.	.80	.81	.66	.85	.57	.84
No. 2, N. C., bgs ....lb.	...	.74	.62	.74	.46	.73
No. 3, Chalky, bgs ...lb.	.70	.73	.55	.77	.43	.66
No. 3, N. C., bgs ....lb.	.73	.74	.58	.79	.47	.68
Ceresin, dom, bgs .....lb.	.12½	.13	.11	.13	.11½	.15
Japan, 224 lb cases ....lb.	.32	.35	.16½	.35	.15½	.16½
Montan, crude, bgs ....lb.	no prices		no prices		no prices	
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.24	.25	.24	.25	.22	.25
Cakes, cases ....lb.	.25	.26	.25	.26	.23	.25
Wood Flour, c-l, bgs ....ton						
bgs, c-l, wks ....ton	24.00	25.00	24.00	25.00	20.00	30.00
Whiting, chalk, com 200 lb	18.00	19.00	18.00	19.00	11.50	19.00
Gilders, bgs, c-l, wks ..ton	16.00	20.00	16.00	20.00	12.00	20.00
Xylol, frt all'd, East 10° tks, wks ....gal.	...	.29	...	.29	...	.30
Com'l tks, wks, frt all'd gal.	...	.26	...	.26	...	.27
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.35	.36
Zein, bgs, 1000 lb lots, wks ....lb.	...	.20	...	.20	...	.20
Zinc Acetate, tech, bbls, lcl, delv ....lb.	.15	.16	.15	.16	.15	.16
Arsenite, bgs, frt all'd..lb.	...	.12	...	.12	.12	.12½
Carbonate tech, bbls, NY lb.	.14	.16	.14	.16	.14	.16
Chloride fused, 600 lb drs, wks ....lb.	...	.04¼	...	.04¼	.04¼	.046
Gran, 500 lb drs, wks lb.	...	.05	...	.05	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.90	2.25	2.90	...	2.25

* Aug. 29.

Current

Zinc Cyanide
Oil, Whale

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Zinc (continued):						
Cyanide, 100 lb drs ....lb.	.33	.35	.33	.35	...	.33
Dust, 500 lb bbls, c-l, delv lb.	...	.09¼	...	.09¼	.07½	.08½
Metal, high grade slabs, c-l,						
NY ....1000 lb.	...	7.65	...	7.65	5.90	7.64
E. St. Louis .....100 lb.	...	7.25	...	7.25	4.60	7.25
Oxide, Amer, bgs, wks lb.	...	.06½	...	.06½	.06¼	.07½
French 300 lb bbls, wks lb.	...	.06¾	...	.06¾	.06¼	.07¾
Palmitate, bbls ....lb.	.24½	.27½	.24½	.27½	.23	.27½
Resinate, fused, pale bbls lb.	...	.10	...	.10	...	.10
Stearate, 50 lb bbls .....lb.	.25	.27	.22	.27	.21½	.24½
Sulfate, crys, 40 lb. bbls						
wks ....lb.	...	.365	.315	.365	.0275	.029
Flake, bbls ....lb.	...	.405	.335	.405	...	.0325
Sulfide, 500 lb bbls, delv lb.	...	.08	...	.08	.07¾	.08
bgs, delv ....lb.	...	.07¾	...	.07¾	.07½	.07¾
Sulfocarbolate, 100 lb kgs lb.	.24	.29	.24	.29	.24	.26
Zirconium Oxide, crude,						
70-75% grd, bbls, wks ton	75.00	100.00	75.00	100.00	75.00	100.00

Oils and Fats

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Babassu, tks, futures .....lb.	no prices		...	.06	.05¾	.06⅝
Castor, No. 3, 400 lb drs lb.	.12	...	.09¾	.11¼	.09¾	.12¾
Blown, 400 lb drs ...lb.	...	.13¼	.11¾	.13¼	.11¾	.14¾
China Wood, drs, spot NY lb.	...	.34¾	.27¼	.34¾	.22½	.28
Tks, spot NY ....lb.	nom.	.33¼	.26¼	.33¼	.21½	.27
Coconut, edible, drs NY ..lb.	nom.	.13	.08	.13	.07½	.09⅜
Manila, tks, NY ....lb.	.07	nom.	.03⅜	.07	.02¾	.03¼
Tks, Pacific Coast ....lb.	...	no prices		.03¼	.02¾	.03½
Cod, Newfoundland, 50 gal						
bbls ....gal.	.78	.80	.60	.80	.60	.72
Copra, bgs, NY ....lb.	...	.04	.0180	.04	.0165	.0190
Corn, crude, tks, mills ...lb.	.11½	nom.	.06⅝	.12¼	.05⅛	.06½
Refd, 375 lb bbls, NY..lb.	.14¾	nom.	...	.14¾	.07⅞	.09
Degras, American, 50 gal						
bbls, NY ....lb.	.08¼	.08¾	.07½	.08¾	.08	.10
Greases, Yellow ....lb.	...	.07¾	.04¾	.07¾	.03	.05¼
White, choice, bbls, NY lb.	nom.	.08¼	.05	.08¼	.03⅜	.05⅝
Lard, Oil, Edible, prime..lb.	...	.13½	.08½	.13½	.08	.10
Extra, bbls ....lb.	...	.12½	.08¼	.12½	.06¾	.09⅜
Extra, No. 1, bbls .....lb.	...	.12¼	.08	.12¼	.06⅞	.08⅞
Linseed, Raw less than 5						
drs lots ....lb.	...	.12	.091	.123	.09	.116
drs, c-l, spot ....lb.	.113	.115	.095	.190	.084	.110
Tks ....lb.	.1040	.1060	.084	.1060	.078	.104
Menhaden, tks, Baltimore gal.	.55	nom.	.30	.60	.21	.35
Refined, alkali, drs .....lb.	...	.116	.084	.116	.067	.088
Kettle boiled, drs ......lb.	...	.126	.096	.126	.079	.10
Light pressed, drs .....lb.	...	.106	.082	.106	.061	.085
Tks ....lb.	...	.094	.072	.094	.055	.072
Neatsfoot, CT, 20°, bbls, NY lb.	.26½	nom.	.18¼	.26½	.15¼	.19¼
Extra, bbls, NY ....lb.	...	.12½	.08¼	.12½	.06⅞	.09
Pure, bbls, NY ....lb.	...	.17¾	.12¼	.17¾	.08	.14¼
Oiticica, bbls ....lb.	.21½	.22	.16½	.22	.17	.21
Oleo, No. 1, bbls, NY ...lb.	...	.11½	.07⅜	.11½	.07⅜	.07¾
No. 2, bbls, NY ......lb.	...	.11¾	.07⅜	.11¾	.07⅜	.07¾
Olive, denat, bbls, NY ..gal.	3.85	4.00	2.25	4.00	.94	2.40
Edible, bbls, NY .....gal.	4.75	5.00	4.75	5.25	1.85	3.25
Foots, bbls, NY ....lb.	.16¾	.17¼	.10¼	.17¾	.08	.10¼
Palm, Kernel, bulk ....lb.	no prices		no prices		no prices	
Niger, cks ....lb.	.08	nom.	.04¼	.08	.03¼	.05½
Sumatra, tks ....lb.	...	.07½	.02	.07½	.02⅛	.03
Peanut, crude, bbls, NY lb.	.11½	nom.	.08¾	.11½	.06¾	.09
Tks, f.o.b. mill ....lb.	no prices		.05¼	.07⅛	.05⅛	.07⅛
Refined, bbls, NY .....lb.	.14¾	nom.	.08	.14¾	.07⅜	.09¾
Perilla, drs, NY ....lb.	.21½	.22	.18	.22	.19	.21
Tks, Coast ....lb.	...	.20½	.16½	.20½	.18½	.20
Pine, see Pine Oil, Chem. Sec						
Rapeseed, blown, bbls, NY lb.	nom.	.17½	.16½	.17½	.17	.17½
Denatured, drs, NY ..gal.	no prices		.95	1.00	1.00	1.05
Red, Distilled, bbls ......lb.	.11½	.12½	.07¼	.12½	.06¼	.09½
Tks ....lb.	.10¾	...	.06¼	.11½	.05¾	.08
Sardine, Pac Coast, tks..gal.	nom.	.57½	.39	.57½	.31	.39
Refined alkali, drs .....lb.	...	.116	.084	.116	.067	.088
Light pressed, drs .....lb.	...	.106	.078	.106	.061	.082
Tks ....lb.	...	.094	.072	.094	.055	.072
Sesame, white, dom ......lb.	nom.	.09½	...	.09½	.07¼	.11¾
Soy Bean, crude						
Dom, tks, f.o.b. mills ..lb.	.11¼	.12	.05½	.12¼	.04¾	.06¼
Crude, drs, NY .....lb.	..	.12¼	.06¼	.12¼	.05¾	.07¾
Ref'd, drs, NY ....lb.	.12¼	.12¾	.07⅝	.12¾	.07¼	.08½
Tks ....lb.	...	.12	05⅜	.12	.06¼	.07⅝
Sperm, 38° CT, bleached						
bbls, NY ....lb.	...	.122	.11	.122	.105	.11
45° CT, blchd, bbls, NY lb.	...	.115	.103	.115	.098	.103
Stearic Acid, double pressed						
dist bgs ....lb.	.12¾	.13¾	.09½	.13¾	.09¾	.13
Double pressed saponified						
bgs ....lb.	.13	.14	.09¾	.14	.10	.13¾
Triple pressed dist bgs lb.	.15½	.16½	.12½	.16½	.12½	.16½
Stearine, Oleo, bbls ......lb.	nom.	.09	..	.09	.05¼	.06½
Tallow City, extra loose..lb.	.07⅜	...	...	.07⅜	.03⅜	.05⅜
Edible, tierces ....lb.	no prices		.	.05⅛	.04⅜	.05¼
Acidless, tks, NY .....lb.	...	.11½	.07½	.11½	.06¼	.08
Turkey Red, single, drs ..lb.	...	.06½	.06½	.07	.082	.09
Double, bbls ....lb.	...	.09½	.09½	.11	11	.12¾
Whale:						
Winter bleach, bbls, NY lb.	...	.1010	.099	.1010	...	.095
Refined, nat, bbls, NY lb.	...	.1050	.095	.1050	..	.091

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A330. Ciba Review, 39; Booklet on madder and turkeyred contains following chapters: The Cultivation of Madder, The History of Turkey Red Dyeing, The Chemistry and Technique of Turkey Red Dyeing, Turkey Red Dyeing in South and South East Asia. Ciba Co.

A331. Finishes and Plastics; 12-page booklet describes the use of Heresite, a line of phenol-formaldehyde resins, in industrial coatings. Heresite and Chemical Co.

A334. The Amberlites; 24-page illustrated booklet describes these synthetic ion exchange resins, one of the most important recent developments in the field of resin technology. The booklet contains a wealth of information regarding the general properties and proposed applications of these materials. The Resinous Products & Chemical Co.

Equipment—Containers

E519. Centrifugal Pumps; 4-page bulletin, W-304-B2, describes, illustrates, and gives engineering specifications for type U two-stage centrifugal pumps. Worthington Pump and Machinery Corp.

E520. Cochrane Reprints, No. 16; The Removal of Dissolved Gases from Boiler Feedwater. By Arthur E. Kittredge, Chief Engineer, Cochrane Corp.

E521. Contribution to Defense; 12-page booklet No. 1917, titled "Just Another Job," points out in pictorial review that 80% of the company's output consists of either direct or indirect orders for national defense material. Link-Belt Co.

E522. Conveying System; Book No. 1975. 24 pages of illustrated material describing new power-operated conveyor system for the positive and continuous conveying of flowable granular, crushed, ground or pulverized materials in capacities of 1 to 140 tons per hour. Link-Belt Co.

E523. Dust Collectors, Bulletin 907; 6-page folder of descriptions and illustrations of unit type collectors. Pangborn Corp.

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E528. Magnetic Pulleys; 16-page comprehensive reference catalog on subject of magnetic pulleys and magnetic pulley separator units, containing descriptive matter, illustrations, specifications, applications and other data on the subject. Stearns Magnetic Manufacturing Co.

E529. New Spring Alloys for Tough Jobs; Detailed booklet on the value of five different metals for spring purposes under conditions which involve exposure to corrosion and high and low temperatures. The five metals included are the two heat-treatable alloys "Z" Nickel and "K" Monel, and Monel, Inconel, and malleable nickel. Three of the booklet's twelve pages are devoted to illustrations and actual service records of springs made of the five metals. Three additional pages contain technical data and tables on strength, stiffness, endurance, resistance to corrosion and corrosion fatigue, effects of high temperature, and magnetic and electrical properties. The International Nickel Co., Inc.

E530. Nickel Alloys; 12-page catalog giving individual characteristics, mechanical properties and application information on the nickel alloys; Monel, "KR" Monel, "K" Monel, "S" Monel, "R" Monel, Nickel, "Z" Nickel and Inconel. Tables of physical constants and available forms are included. The International Nickel Co., Inc.

E531. Selflube Porous Bearings; 24-page booket describing bearings made with self lubricating material. Contains illustrations and extensive engineering data. Keystone Carbon Co., Inc.

E532. Thermocouple Data Book and Catalog, Bulletin No. S2-3; 32 pages contain valuable information such as temperature conversion tables, millivolt tables, pipe and wire sizes, decimal equivalents, wire resistances, recommendations for checking thermocouples and pyrometers, information on how to construct thermocouples, etc, Prices and descriptions of a complete line of thermocouples and accessories are given with recommendations and information concisely presented. Wheelco Instrument Co.

E533. Turbine Sifter, Bulletin No. 52; 8-page booklet describes and illustrates line of turbine sifters. Gives list of materials advantageously handled by these sifters. Abbe Engineering Co.

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E537. Welding System; A constant potential DC welding system for supplying welding energy to multiple arc circuits is described. Westinghouse Electric and Manufacturing Co.

E538. What Every Employer Should Know About Labor Relations; How management can meet today's labor problems is described in a 12-page guide issued by Labor Relations Institute, an organization sponsored by industrial executives. Labor Relations Institute.

E539. Wire Rope, Catalog G-14; 170-page handbook, sectionalized for quick reference with a tabbed index and table of contents for each section. Lists more than 1000 ropes, contains 60 pages of general information, and supplies a glossary of every day wire rope terms. Macwhyte Company.

E540. Deaerators; 36-page catalog, No. 3005, gives comprehensive treatment of tray-type deaerators, atomizing deaerators, deaerating hot water generators and cold water deaerators. Line diagrams in three colors and cross sectional photographs clarify the operating features. Cochrane Corp.

E541. Oilless Bronze Bearings; catalog describing oilless bronze bearings is arranged in three sections. One describes lubricating properties of metaline, second part outlines various types and the range of application for oilless bearings and lastly, the catalog presents detailed data for use in preparing specifications. R. W. Rhoades Metaline Co., Inc.

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"We"—Editorially Speaking

We see by the papers:

In an editorial in Drug and Cosmetic Industry entitled "Cosmetics for Defense"—"For the more cosmetics used, the better the morale of the nation as a whole. This is because women feel much better about everything in general when they are well groomed; and if the women have a bright outlook, it is bound to be reflected in the men and the children." Perhaps Mrs. Roosevelt might be persuaded to publicize this profound discovery by a sentence or two in her syndicated column "My Day."

From the New York Times—"Before the downfall of France a Parisian artist lampooned the German situation, which must be far worse than ours, in a cartoon which depicted frantic Hitler hysterically screaming; 'Where is the Ersatz for the Ersatz?' To this pass we also are beginning to be reduced. "

Farm Chemurgy has moved along quite a pace in the automotive field. For every million cars Ford uses 69,300,000 pounds of cotton—a 433,125-acre crop—for upholstery and tires, 3,204,000 pounds of wool from 801,000 sheep, 112,000,000 board feet of wood, 1,500,000 square feet of leather from 30,000 cattle, 600,000 bushels of soybeans, 118,000 bushels of flax from 17,500 acres for solvents, 195,000 gallons of tung oil for varnishes, 1,000,000 pounds of lard from 20,000 hogs for rear axle lubricants, 451,500 bushels of corn from 11,280 acres, 120,000 pounds of wheat as foundry flour, 350,000 pounds of mohair from 87,500 goats, 5,000,000 pounds of jute for carpet backing, 2,060,000 pounds of pine pitch, sugar cane—enough for 2,500,000 gallons of molasses—in alcohol and solvents, 6,000 pounds of beeswax from 83,000,000 bees for electrical products, and 150,000 gallons of castor oil for hydraulic fluid, artificial leather and lacquer.

Maury Maverick, ex-congressman and currently mentioned for a half-a-dozen New Deal plums, gets the palm for his suggestion of easing the gasoline shortage by having each motorist driving East from the Pacific Coast or Texas carry a sealed 55-gallon drum to designated receiving depots.

Well, Well—another champagne plant trip at the Atlantic City A. C. S. Meeting. It might be described as an innocuous plant inspection excursion depending, of course, upon the point of view.

May we introduce T. N. Sandifer, our new Washington editor, to our readers. He takes over in the place of Mack H. Williams who is now in military service. Mr. Sandifer has had approximately 20 years experience as a Washington correspondent for national press associations, and as a writer for national magazines including those in the trade and technical field. His material has appeared in such representative papers as Manufacturers' Record, Public Utilities Fortnightly, besides several popular general publications.

He has spent the past two decades as a member of House and Senate Press Galleries, covering national legislation, and until late 1935 was specially-assigned White House correspondent for International News Service. He has been a member of the Latin American staff of United Press for several years.

Long and varied service has given him an extensive background on all types of Washington news. His past eight years service have given him a close-up of New Deal activities in all spheres, having been specially assigned to most of the special agencies set up by the current Administration, beginning with NRA and down to the present OPACS and OPM, among others. Mr. Sandifer distinctly knows his way around the Washington merry-go-round.

We hear one of the large chemical companies has just appointed a vice-president in charge of no!

Otto Eisenschiml, who runs Scientific Oil Compounding in Chicago, serves breakfast to his employees, according to a recent American Magazine article. Can you imagine the responsibilities carried on the shoulders of the coffee maker?

According to rumors from Detroit plastic automobiles will make their appearance in '43 in a price range of $350-$400. Just think of walking into the auto dealer and saying "Make mine plastic."

Isn't it a rather strange coincidence that with Mr. Henderson, Mr. Arnold and Mr. Ickes screaming to high heaven about the curse of the aluminum monopoly that that product is one of the few that has actually decreased in price? In fact it appears that it is the highly competitive materials that are shooting upward so rapidly. We can just visualize these three gentlemen seated in their respective offices in Washington yelling "You can't do this to ME!"

The Novocol Chemical Manufacturing Company of Brooklyn, N. Y., is adding a movie theatre to its new building where films depicting research work in the development of local anesthesia will be shown. Lately we have seen some Hollywood films that are far from local in their effect.

According to an announcement from the Universal Oil Products Co. of Chicago Russia is now considered to be the second nation in importance in chemical research, the United States being the leader. Perhaps Herr Hitler might now agree there is something to this. However, this reminds us somewhat of a friend of ours who did a lot of sailing and invariably reported on Monday morning that he had finished second. Finally some suspicious soul found out that there were only two boats racing and the finishes were hardly "photo" ones.

FIFTEEN YEARS AGO

From Our Files of September, 1926

International Union of Pure and Applied Chemistry meeting in Washington decides to re-admit German chemists to membership.

A. E. Marshall elected president at 4th annual meeting of Association of Chemical Equipment Manufacturers.

Monsanto appoints J. A. Berninghaus manager of heavy acid and intermediate sales.

Druachem Club gives up rooms and becomes associated with the New York Press Club.

SEP 29 1941 DETROIT

State of Chemical Trade

Current Statistics (August 31, 1941)—p. 88

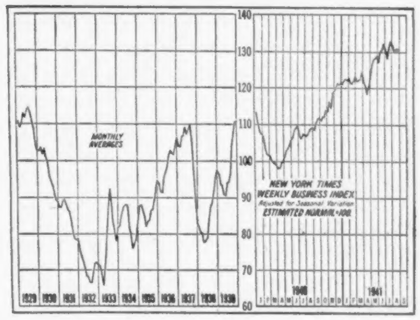
WEEKLY STATISTICS OF BUSINESS

Week Ending	Carloadings 1941	Carloadings 1940	Carloadings % of Change	Electrical Output† 1941	Electrical Output† 1940	Electrical Output† % of Change	Jour. of Com. Price Index	*Nat'l Fertilizer Ass'n Chem. & Drugs	*Nat'l Fertilizer Ass'n Fats & Oils	*Nat'l Fertilizer Ass'n Fert. Mat.	*Nat'l Fertilizer Ass'n Price Indices Mixed Fert.	*Nat'l Fertilizer Ass'n Price Indices All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher Commodity Index
Aug. 2......	883,065	717,927	+23.0	3,226,141	2,762,240	+16.8	92.9	105.7	117.5	112.3	106.4	113.3	85.5	97.6	131.8	106.6
Aug. 9......	878,549	727,073	+20.8	3,196,009	2,743,284	+16.5	92.7	106.2	119.2	112.6	106.4	113.7	85.7	96.3	130.4	103.9
Aug. 16......	890,374	743,050	+19.8	3,200,818	2,745,697	+16.6	93.5	106.2	116.8	112.7	106.4	114.1	85.9	95.6	130.9	103.4
Aug. 23......	899,750	761,108	+18.2	3,193,404	2,714,193	+17.7	94.7	106.3	119.0	112.7	107.1	114.7	85.9	96.2	130.8	103.1

MONTHLY STATISTICS

CHEMICAL:	July 1941	July 1940	June 1941	June 1940	May 1941	May 1940
Acid, sulfuric (expressed as 50° Baumé, short tons, Bureau of the Census)						
Total prod. by fert. mfrs.	......	......	208,884	176,846	217,063	191,643
Consumpt. in mfr. fert.	......	......	162,334	137,321	176,465	143,742
Stocks end of month	......	......	77,545	90,971	78,756	89,282
Alcohol, Industrial (Bureau Internal Revenue)						
Ethyl alcohol prod., proof gal..	......	......	32,223,500	21,422,583	29,606,217	20,947,639
Comp. denat. prod., wine gal...	......	......	964,701	510,665	951,787	784,465
Removed, wine gal.	......	......	982,849	469,216	928,520	704,490
Stocks end of mo., wine gal...	......	......	441,151	498,982	460,551	457,963
Spec. denat. prod., wine gal. ...	......	......	14,422,185	9,195,976	13,762,183	9,252,972
Removed, wine gal.	......	......	14,630,687	9,155,505	13,960,954	9,332,121
Stocks end of mo., wine gal...	......	......	653,416	1,163,490	868,677	1,127,597
Ammonia sulfate prod., tons *a*..	......	......	61,391.6	61,494.9	61,495	57,780.5
Benzol prod., gal. *b*	......	......	11,562,800	11,075,000	12,085,000	10,397,000
Byproduct coke, prod., tons *a*..	......	......	4,836,035	4,387,200	4,845,854	4,256,000
Cellulose Plastic Products (Bureau of the Census)						
Nitrocellulose sheets, prod., lbs.	851,752	680,067	913,725	535,226	935,239	544,352
Sheets, ship., lbs.	895,069	679,766	988,185	587,953	863,997	645,921
Rods, prod., lbs.	291,167	156,643	332,433	169,922	306,749	188,938
Rods, ship., lbs.	330,943	210,930	363,191	203,560	346,031	222,296
Tubes, prod., lbs.	166,022	62,413	140,482	64,756	130,457	67,056
Tubes, ship., lbs.	127,116	64,158	124,067	58,538	104,711	58,211
Cellulose acetate, sheets, rod, tubes						
Production, lbs.	507,081	564,729	512,506	633,808	524,393	702,385
Shipments, lbs.	541,039	407,830	523,438	562,223	472,328	648,535
Molding comp., ship.; lbs. ...	2,346,469	777,367	2,264,470	682,095	2,145,523	837,151
Methanol (Bureau of the Census)						
Production, crude, gals.	417,377	390,004	436,124	425,578	463,013	441,888
Production, synthetic, gals.	4,724,688	3,852,669	4,662,744	3,426,100	3,698,328	3,486,233
Pyroxylin-Coated Textiles (Bureau of the Census)						
Light goods, ship., linear yds...	4,416,772	2,413,798	4,170,383	2,236,151	4,733,765	2,639,599
Heavy goods, ship., linear yds..	3,075,946	2,016,516	2,968,087	1,794,124	3,172,565	1,864,260
Pyroxylin spreads, lbs. *c*	6,472,685	4,435,473	7,151,433	3,931,148	7,350,684	4,102,401
Exports (Bureau of Foreign & Dom. Commerce)						
Chemicals and related prod. *d*..	......	......	......	......	$22,752	$18,460
Crude sulfur *d*	......	......	......	......	$660	$1,599
Coal-tar chemicals *d*	......	......	......	......	$2,291	$3,318
Industrial chemicals *d*	......	......	......	......	$5,281	$4,572
Imports						
Chemicals and related prod. *d*..	......	......	......	......	$6,008	$5,698
Coal-tar chemicals *d*	......	......	......	......	$885	$473
Industrial chemicals *d*	......	......	......	......	$1,394	$1,091
Employment (U. S. Dept. of Labor, 3 year av., 1923-25 = 100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	137.8	118.5	135.8	119.0	133.1	120.6
Other than petroleum	140.4	117.4	138.3	118.0	135.9	120.4
Chemicals	176.0	140.4	172.1	138.3	166.4	136.2
Explosives	Not	Available	......	......	Not available	......
Payrolls (U. S. Dept. of Labor, 3 year av., 1923-25 = 100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	173.6	133.0	171.1	133.2	162.2	133.5
Other than petroleum	178.6	131.9	175.5	132.0	167.0	132.5
Chemicals	239.6	167.2	232.6	165.2	221.7	161.9
Explosives	Not	Available	......	......	Not available	......
Price index chemicals*	......	......	......	......	86.8	85.1
Drugs & Pharmaceuticals* ...	......	......	......	......	98.7	82.0
Fert. mat.*	......	......	......	......	71.1	70.8
Paint and paint mat.	......	......	......	......	89.3	86.0
FERTILIZER:						
Exports (long tons, Nat. Fert. Association)						
Fertilizer and fert. materials ...	......	......	......	......	81,971	108,207
Total phosphate rock	......	......	......	......	64,239	61,066
Total potash fertilizers	......	......	......	......	3,318	1,499
Imports (long tons, Nat. Fert. Association)						
Fertiliser and fert. materials ...	......	......	......	......	111,461	147,473
Sodium nitrate	......	......	......	......	47,190	79,299
Total potash fertiliser	......	......	......	......	1,724	30,197

INDUSTRIAL TRENDS



Business: Business and industrial activity continue at high levels. There has been some up and down fluctuation in business indexes with the downs possibly having a slight edge. The New York Times index of business activity was placed at 130.5 for week ended August 30 as compared with 131.5 for week ended July 26. The Federal Reserve Board's index of industrial production, which includes allowance for a considerable decline at this season, advanced from 157 in June to 162 in July and about 164 in August.

Steel: General preference order M-21 of the OPM placed all producers of steel under a mandatory priority system August 9.

Production of steel ingots for first seven months of this year reached record breaking level of 47,730,225 tons with July output at 6,821,682 tons. For this seven months period production was 35% above corresponding period in 1940 and 24% above previous record period in 1929.

Stocks of scrap continue to decline. At the end of June domestic stocks approximated 6,529,000 net tons, showing a decline of 10% from March 31.

Carloadings: Total loadings of revenue freight showed little change during the past month from the high levels reached in June and July. A recession in freight traffic may develop following the fall peak around October 1. This does not mean that there will be a steep decline in volume but that loadings will probably follow the normal seasonal pattern more closely.

Automotive: Automobile production declined less than usual in July. 444,103 vehicles were produced as

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compared with 231,703 in July, 1940. In August there was a sharp decline.

Toward the end of August, producers were told that production of passenger vehicles must be cut 26½% during months August through September and progressively more in subsequent months, with the expectancy of a 50% curtailment for the year which will end July 31, 1942.

Electric Output: Generation of power remained at high levels during the past month, averaging about 17% above similar period of 1940. Curtailment in certain industries, such as silk, hosiery, automobile and the effect of priorities on other smaller industries are expected to release considerable power to more essentially armament industries in the next few months.

Construction: July construction contracts awarded in 37 eastern states, amounting to $577,392,000, reached a 12 year peak, being the highest July since 1929, according to F. W. Dodge Corp.

Retail Trade: Sales at department stores and in rural areas declined by much less than the usual amount in July and variety store sales increased further. In first half of August department store sales rose sharply.

Commodity Prices: Despite additions to the list of commodities over which ceilings have been set by the Government prices continue on the upward trend. Higher prices for grains and meats lead the advance of a general increase which includes textile, building materials, and many industrial products.

Textiles: Wool, cotton and rayon industries remained at peak operating levels. Silk operations fell off as a result of shortage of raw silk from Japan.

Outlook: The main problems in keeping industrial activity at a high peak will probably arise in the shifting of production for civilian consumption to production for the armament program.

Priorities will favor certain industries with raw materials and equipment. This is likely to cause hardship and affect employment in industries that do not more or less directly contribute to the armament program. The automobile industry will be a major example of this except that in this case the productive capacity will be diverted to arms production.

More price controls and control of buying and inventories will probably be effected by the OPACS and OPM.

MONTHLY STATISTICS (cont'd)

FERTILIZER: (Cont'd)	July 1941	July 1940	June 1941	June 1940	May 1941	May 1940
Superphosphate e (Nat. Fert. Association)						
Production, total	......	......	307,907	272,235	341,348	303,167
Shipments, total	......	......	272,209	199,784	538,863	560,250
Northern area	......	......	156,903	125,893	370,551	398,667
Southern area	......	......	115,306	73,891	168,312	161,582
Stocks, end of month, total	......	......	937,869	1,051,092	863,833	965,828
Tag Sales (short tons, Nat. Fert. Association)						
Total, 17 states	68,239	39,800	143,548	148,990	331,797	406,474
Total, 12 southern	58,009	32,329	103,774	121,557	257,682	328,702
Total, 5 midwest	10,230	7,471	39,774	27,433	74,115	77,772
Fertilizer employment *i*	88.5	79.8	92,5	88.5	128.4	128.8
Fertilizer payrolls *i*	87.0	69.7	93.7	78.4	129.3	118.1
Value imports, fert. and mat. *d*	......	......	......	......	$2,495	$3,406
GENERAL:						
Acceptances outst'd'g *f*	$209	$188	$212	$206	$215	$213
Coal prod., anthracite, tons	4,623,000	4,534,000	4,891,000	4,492,000	3,858,000	3,955,000
Coal prod., bituminous, tons	43,300,000	35,890,000	42,774,000	32,400,000	43,400,000	35,468,000
Com. paper outst'd'g *f*	$330	$232	$299	$224	$295	$234
Failures, Dun & Bradstreet	908	1,175	970	1,114	1,119	1,238
Factory payrolls *i*	152.5	98.2	152,1	99.5	141.9	97.8
Factory employment *i*	130.5	103.2	127.8	103.1	124.7	102.5
Merchandise imports *d*	......	......	$279,536	$211,390	$296,930	$211,470
Merchandise exports *d*	......	......	$337,745	$349,728	$384,636	$323,749
GENERAL MANUFACTURING:						
Automotive production	444,103	231,703	520,521	344,636	518,748	391,215
Boot and Shoe prod., pairs	44,353,063	34,012,164	39,726,391	28,121,118	41,087,435	42,841,403
Bldg. contracts, Dodge *j*	$577,392	$398,673	$539,106	$324,000	$548,700	$328,914
Newsprint prod., U. S. tons	83,199	82,579	83,962	84,762	90,913	90,207
Newsprint prod., Canada, tons.	293,483	332,689	273,697	315,343	284,767	323,563
Glass containers, gross‡	......	......	6,166	4,429	6,246	4.701
Plate glass prod., sq. ft.	......	......	18,533,500	9,783,100	18,394,300	11,720,500
Window glass prod., boxes	......	......	1,304,200	907,900	1,281,500	1,068,200
Steel ingot prod., tons	6,821,682	5,724,625	6,800,730	5,657,000	7,055,000	4,697,000
% steel capacity	95.6	83.0	98.2	84.5	98.7	71.8
Pig iron prod., tons	4,770,778	4,053,945	4,553,165	3,818,897	4,599,966	3,513,683
U.S. cons'pt. crude rub., lg. tons	......	......	84,912	47,834	71,365	51,619
Tire shipments	......	......	......	......	7,732,828	5,755,448
Tire production	......	......	......	......	6,072,823	5,413,002
Tire inventories	......	......	......	......	8,373,324	10,522,523
Cotton consumpt., bales	......	......	875,137	565,416	918,902	641,636
Cotton spindles oper.	......	......	......	......	22,980,286	22,213,378
Silk deliveries, bales	28,328	20,117	23,751	17,307	21,940	18,997
Wool consumption *s*	......	......	55.7	25.7	57	26.9
Rayon deliv., lbs.	......	......	......	......	40,200,000	31,900,000
Rayon employment *i*	327.1	306.9	327.0	306.0	323.8	304.3
Rayon payrolls *i*	367.0	314.7	362.4	314.4	355.9	311.4
Soap employment *i*	96.2	81.3	93,3	81.5	91.7	81.4
Soap payrolls *i*	135,1	99.9	129.0	100.4	125.4	98.0
Paper and pulp employment *i*	126.1	117.1	124.6	116.2	122.8	115.2
Paper and pulp payrolls *i*	157.1	126.3	157.7	126.2	145.5	124.2
Leather employment *i*	95.3	80.1	93.9	80.1	89.7	80.6
Leather payrolls *i*	108.7	76.0	106.6	75.7	97.7	76.7
Glass employment *i*	128.8	103.3	125.4	104.9	123.6	104.4
Glass payrolls *i*	149.7	105.2	153,3	111.0	147.6	112.0
Rubber prod. employment *i*	111.4	83.5	110.7	83.4	106.4	83.8
Rubber prod. payrolls *i*	135.4	85.2	141.1	86.4	129.2	87.1
Dyeing and fin. employment *i*	139.6	116.1	139.3	115.7	140.9	122.6
Dyeing and fin. payrolls *i*	134.5	95.0	133.2	93.0	131.8	98.9
MISCELLANEOUS:						
Oils & Fats Index ('26 = 100)[1]	134.3	53.4	128.0	53.1	121.1	57.0
Gasoline prod., *p*	......	......	56.987	51,325	52,258	47,349
Cottonseed oil consumpt., bbls.	......	......	......	......	377,948	299,833
PAINT, VARNISH, LACQUER, FILLERS:						
Sales 680 establishments, dollars	$48,950,308	$35,553,580	$54,336,429	$37,897,861	$58,413,147	$43,463,222
Trade sales (580 estbts.) dollars	$24.274.619	$19,573,840	$28,049.452	$21,718,413	$32,517,730	$24,943,448
Industrial sales, total, dollars	$20,132.508	$12,732,233	$21,022,220	$12,582,231	$20,544,153	$14,150,310
Paint & Varnish, employ. *i*	145.9	124.6	144.8	126.4	140.7	125.9
Paint & Varnish, payrolls *i*	174.1	133.4	177.8	136.2	169.1	136.3

a Bureau of Mines; *b* Crude and refined plus motor benzol, Bureau of Mines; *c* Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; *d* 000 omitted, Bureau of Foreign & Domestic Commerce; *e* Expressed in equivalent tons of 16% A.P.A.; *f* 000,000 omitted at end of month; *i* U. S. Dept. of Labor, 3 year average, 1923-25 = 100, adjusted to 1937 Census totals; *j* 000 omitted. 37 states; *p* Thousands of barrels, 42 gallons each; *q* 680 establishments, Bureau of the Census; *r* Classified sales, 580 establishments, Bureau of the Census; *s* 53 manufacturers, Bureau of the Census, in millions of lbs.; *t* 387 identical manufacturers, Bureau of the Census, quantity expressed in dozen pairs; *v* In thousands of bbls., Bureau of the Census; ** Indices, Survey of Current Business, U. S. Dept. of Commerce; *z* Units are millions of lbs.; ‡ 000 omitted; * New series beginning March, 1940; [1] Revised series beginning February, 1940.

Chemical Finances

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Virginia-Carolina Earns Less

Virginia-Carolina Chemical Corp., and wholly owned subsidiaries in report for fiscal year ended June 30, 1941, certified by independent auditors, show net profit of $359,936 after depreciation, depletion, interest, federal income taxes, etc., equal to $1.69 a share on 213,052 shares (par $100) of 6% cumulative participating preferred stock on which dividend accumulations on June 30, last, amounted to $16,511,541 or $77.50 a share.

This compares with net profit of $615,-460 or $2.89 a share on 6% preferred stock in preceding year.

Provision for federal income taxes for year ended June 30, last, was $193,977 against $111,956 in preceding year.

Merck Earns $1.45

Merck & Co., Inc., and subsidiaries report for the six months ended June 30 net earnings, before allowance for taxes and other adjustments, of $4,775,407 as compared with $2,222,946 shown for the first three months of the year. After allowance for income and excess profits taxes and other special reserves, the Company reports net income for the six months of $1,591,073 equal to $1.45 a share on the outstanding common stock.

American Cyanamid Net Up

American Cyanamid Co. and subsidiaries in report for six months ended June 30, 1941, subject to audit and year-end adjustments, show net profit of $2,649,921 after depreciation, depletion, research and process development expenses, interest, amortization and provision of $3,305,433 for federal and foreign income taxes and $1,700,000 for contingencies. Above net is equal, after preferred dividends, to 93 cents a share on combined 2,618,364 shares of Class A and Class B common stocks.

This compares with adjusted net profit of $2,357,673 or 85 cents a share on combined common shares in first half of 1940, after provision of $1,462,000 for federal and foreign income taxes and $500,000 for contingencies.

Dividends and Dates

Name	Dividend	Stock Record	Payable
Abbott Laboratories			
quar.	$ .40	Sept. 11	Sept. 30
Extra	.10	Sept. 11	Sept. 30
4½% pref. quar.	1.125	Oct. 1	Oct. 15
Allied Cemical & Dye Corp. quar.	1.50	Sept. 5	Sept. 20
American Cyanamid Co.			
A com. quar.	.15	Sept. 11	Oct. 1
B com. quar.	.15	Sept. 8	Oct. 1
5% conv., pref. 1st series quar.	.12½	Sept. 8	Oct. 1
5% conv., pref. 2nd series quar.	.12½	Sept. 8	Oct. 1
5% conv., pref. 3rd series quar.	.12½	Sept. 8	Oct. 1
Colgate-Palmolive-Peet Co.			
$4.25 pref. quar.	1.06½	Sept. 9	Sept. 30
Dewey & Almy Chemical			
Co., com.	.35	Aug. 29	Sept. 15
Class B	.35	Aug. 29	Sept. 15
$5 Conv., pref. quar.	1.25	Aug. 29	Sept. 15
Diamond Alkali Co.	.50	Aug. 30	Sept. 12
du Pont de Nemours & Co., E. I.			
Com. interim	1.75	Aug. 25	Sept. 13
4.50 pref. quar.	1.125	Oct. 10	Oct. 25
Durez Plastics & Chemicals,			
Inc., com.	.50	Aug. 15	Sept. 2
7% pref. quar.	1.75	Aug. 15	Sept. 2
6% pref. quar.	.375	Aug. 15	Sept. 2
Heyden Chemical			
Corp.	.75	Aug. 21	Sept. 2
4¼% pref. A initial quar.	1.0625	Aug. 21	Sept. 2
International Vitamin Corp.	.07½	Sept. 26	Sept. 30
Jefferson Lake Sulphur Co., Inc., 7% pref. S.A.	.35	Aug. 29	Sept. 10
Koppers Co.			
6% pref. quar.	1.50	Sept. 15	Oct. 1
Lindsay Light & Chemical Co.			
7% pref. quar.	.175	Sept. 5	Sept. 15
Mathieson Alkali Works			
Com. quar.	.375	Sept. 9	Sept. 30
7% pref. quar.	1.75	Sept. 9	Sept. 30
Merck & Co., Inc.	.25	Sept. 19	Oct. 1
United Carbon Co.	.75	Sept. 13	Oct. 1
Vick Chemical Co.			
quar.	.50	Aug. 15	Sept. 2
Extra	.10	Aug. 15	Sept. 2

Earnings Statements Summarized

Company	Annual dividends	Net income 1941	Net income 1940	Common share earnings 1941	Common share earnings 1940	Surplus after dividends 1941	Surplus after dividends 1940
Abbott Laboratories:							
Six months, June 30	y$2.15	$1,018,304	$1,001,402	$1.31	$1.29	......	......
American Agricultural Chemical Co.:							
Year, June 30	y 1.20	1,121,873	908,608	1.79	1.45	368,296	155,035
American Commercial Alcohol Corp.:							
Six months, June 30	f ...	246,688	147,244	.78	.37	......	......
American Cyanamid Co.:							
Six months, June 30	x .60	2,649,921	2,357,673	.93	.85	......	......
American Potash & Chemical Corp.:							
Six months, June 30	y 2.25	†72,222	921,174	....	1.74	......	......
American Viscose Corp.:							
Six months, June 30	w .50	3,375,201	4,067,402	....	....	......	......
Colgate-Palmolive-Peet-Co.:							
Six months, June 30	y 1.00	2,635,051	1,278,230	1.21	.45	1,878,688	400,461
Columbian Carbon Co.:							
Six months, June 30	y 4.60	1,904,036	1,858,280	3.54	3.46	829,224	783,468
Davison Chemical Corp.:							
Year, June 30	y .60	652,311	†135,431	1.26	....	......	......
Eastman Kodak Co.:							
Twenty-four wks., June 14	y 6.00	10,460,425	9,179,170	4.15	3.63	......	......
Interchemical Corp.:							
Six months, June 30	y 1.60	696,468	572,091	1.73	1.30	268,750	144,314
Twelve months, June 30	y 1.60	1,231,405	1,514,768	2.90	3.87	......	......
International Vitamin Corp.:							
Year, June 30	y .30	119,606	120,052	.58	.59	......	......
Merck & Co, Inc.:							
Six months, June 30	w .25	1,591,073	.....	1.45	....	......	......
Pennsylvania Salt Mfg. Co.:							
Year, June 30	y 8.00	1,649,038	1,726,874	10.99	11.51	......	......
Phelps Dodge Corp.:							
Six months, June 30	y 1.75	7,014,854	5,804,538	1.38	1.14	......	......
Texas Electric Service Co.:							
Twelve months, July 31	....	1,201,104	1,552,074	....	....	......	......
U. S. Sugar Corp.:							
Year, June 30	y .25	1,050,805	846,680	.67	.54	......	......
United Carbon Co.:							
Six months, June 30	y 3.00	957,801	902,371	2.41	2.27	360,974	305,544
United States Gypsum Co.:							
Six months, June 30	y 3.50	3,211,826	2,781,458	2.46	2.10	......	......
Virginia-Carolina Chemical:							
Year, June 30	f ...	359,936	615,460	p1.69	p2.89	......	......

a On Class A shares; *b* On Class B shares; *c* On Combined Class A and Class B shares; *d* Deficit. *f* No common dividend; *j* On average number of shares; *k* For the year 1940; *b* On Preferred stock; On Class A shares; *y* Amount paid or payable in 12 months to and including the payable date of the most recent dividend announcement; ‡ Indicated quarterly earnings as shown by comparison of company's reports for the 6 and 9 months periods; § Plus extras; *n* Preliminary statement; *h* On shares outstanding at close of respective periods. ** Indicated quarterly earnings as shown by comparison of company's reports for 1st quarter of fiscal year and the six months period. ‡‡ Indicated earnings as compiled from quarterly reports. † Net loss. * Not available. ¶¶ Before interest on income notes. *x* Paid on or declared in last 12 months plus extra stock. *w* Last dividend declared, period not announced by company.

Price Trend of Representative Chemical Company Stocks

	Aug. 2	Aug. 9	Aug. 16	Aug. 23	Net gain or loss last mo.	Price on Aug. 24 1940	1941 High	1941 Low
Air Reduction Co.	44	43	40⅞	41¼	— 2¾	40¾	45	35¾
Allied Chemical & Dye	163	161¼	161	160⅜	— 2⅝	153⅜	167½	144½
Amer. Agric. Chem.	18¾	18½	17⅝	18⅜	— ⅜	16	18⅞	14⅜
American Cyanamid "B"	39¾	39	39¾	39⅞	+ ⅛	33¼	42⅜	31
Columbian Carbon	82	81	81	80½	— 1½	78	83	69⅞
Commercial Solvents	10½	10¼	10¼	10½		9¼	11⅞	8⅜
Dow Chemical Co.	137¾	134½	132½	133⅜	— 4⅜	152	141¾	120
du Pont de Nemours	158¾	160	157	156¾	— 2	165	164¾	138
Hercules Powder Co.	78½	76¼	76	74⅞	— 3⅝	84	80¼	66
Mathieson Alkali Co.	29⅞	30¼	28⅞	29½	— ⅜	26	30½	24⅛
Monsanto Chemical Co.	89½	90	90	92	+ 2½	91½	92¾	77
Standard Oil of N. J.	43¾	41¾	42	43⅜	— ⅜	34	45⅝	33
Texas Gulf Sulphur	38¼	38½	37⅞	37⅜	— ⅞	31¾	38½	31½
Union Carbide & Carbon	78½	78¼	77½	78¼	— ¼	71¾	79⅝	60
U. S. Industrial Alcohol	31	31¾	31	32⅝	+ 1⅝	18¾	33½	20

Interchemical Earns $696,468

Interchemical Corp. and wholly-owned subsidiaries in report for six months ended June 30, 1941, subject to audit, show net profit of $946,468 after depreciation, existing federal income and excess profits taxes, etc., equal, after preferred dividend requirements, to $2.59 a share on 290,320 shares of common stock. After deducting $250,000 special provision for contingencies, including anticipated increases in federal income and excess profits taxes, net profit for six months was reduced to $696,468, equal to $1.73 a common share.

This compares with reported net profit of $572,091, equal to $1.30 a common share, in first half of 1940.

Chemical Finances
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Chemical Finances
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Chemical Stocks and Bonds

Last (August 1941)	High (August 1941)	Low (August 1941)	1940 High	1940 Low	1939 High	1939 Low	Sales: Number of shares August 1941	Sales: Number of shares 1941	Stocks	Par $	Shares Listed	Dividends 1940*	Earnings** $-per-share-$ 1940	1939	1938
NEW YORK STOCK EXCHANGE															
55⅛	55¼	46	70¼	49¼	71½	53	3,300	20,000	Abbott Labs.	No	755,204	2.15	2.89	2.61	2.43
42⅞	45	35¾	58⅛	36½	68	45¼	22,300	192,400	Air Reduction	No	2,711,137	1.75	2.38	1.98	1.47
162½	167½	144½	182	135½	200½	151½	7,700	57,600	Allied Chem & Dye	No	2,401,288	6.00	9.43	9.50	5.92
18¾	18⅞	14⅝	21	12⅛	24½	16	5,200	46,800	Amer. Agric. Chem.	No	627,981	1.20	1.45	1.22	2.23
9¾	9⅞	4⅝	8¼	4⅛	11⅞	5½	19,500	53,600	Amer. Com. Alcohol	No	280,934	...	.22	—.38	—2.05
32	32	26	35½	23	37	21	2,700	12,400	Archer-Dan.-Midland	No	545,416	1.40	5.71	3.82	.43
72	72¼	61	80½	57	71	50	1,600	8,300	Atlas Powder Co.	No	252,278	4.25	5.71	3,82	2.69
117¾	118½	111	124¾	112½	127	116	160	2,000	5% conv. cum. pfd.	100	68,597	5.00	26.01	18.94	14.77
26	29¾	18⅞	35½	20	30¼	13⅝	48,600	156,100	Celanese Corp. Amer.	No	1,112,788	1.25	3.38	3.53	.20
121¼	121¼	116¾	121	105½	109⅞	84	1,810	12,580	prior pfd.	100	164,818	7.00	38,69	38.67	15.05
15	15	11⅛	20	10⅛	18	11½	20,800	110,400	Colgate-Palm.-Peet	No	1,962,087	1.00	1.72	2.74	1.77
78¾	83	69⅞	98¾	71	96	73	1,400	13,200	Columbian Carbon	No	537,406	4.60	5.71	5.32	5.13
11⅛	11⅞	6⅜	16⅝	8	16	8⅝	47,200	268,200	Commercial Solvents	No	2,636,878	.25	.91	.61	—.11
52⅛	53½	42¼	65⅛	40¼	67½	54⅞	16,400	115,600	Corn Products	25	2,530,000	3.00	3.10	3.32	3.18
176½	182½	170	184	165	177	150	650	5,490	7% cum. pfd.	100	245,738	7.00	38.99	41.18	30.69
20	20	13	23¼	12⅛	32⅝	18	2,770	19,670	Devoe & Rayn. A.	No	95,000	.25	1.14	2.08	—1.72
131¼	141¾	120	171	127¼	144⅝	101½	2,900	28,000	Dow Chemical	No	1,135,187	3.00	6.65	3.76	3.91
155⅞	164¾	138	189¼	146½	188½	126¼	23,000	187,600	DuPont de Nemours	20	11,065,762	7.00	7.23	7.70	3.74
126	126½	120⅞	129⅝	114	124⅛	112	2,400	18,950	4½% pfd.	No	1,688,850	4.50	51.48	52.25	87.27
141¼	142	120¼	166¾	117	186⅛	138⅛	8,000	66,300	Eastman Kodak	No	2,488,242	6.00	7.96	8.55	7.54
175	182½	160	180	155	183½	155½	100	1,980	6% cum.	100	61,657	6.00	325.62	337.65	281.22
40⅜	41	32½	39¼	24¾	36	18¼	13,200	82,500	Freeport Sulphur	10	796,380	2.00	3.81	2.76	1.87
6½	7½	5⅞	10	5½	10⅞	7	4,300	36,700	Gen. Printing Ink	1	735,960	.60	.86	.94	.62
17⅛	17⅜	12¾	19⅝	11	24½	14	8,600	68,800	Glidden Co.	No	829,989	1.00	1.56	1.70	—.29
43¾	46	40¼	45	30	47	34	1,000	9,600	4½% cum. pfd.	50	199.940	2.25	8.64	9.27	1.03
91	95	76	113¼	89⅞	112¼	93	300	8,900	Hazel Atlas	25	434,409	5.00	5.98	6.60	4.97
74	80¼	66	100½	69	101½	63	4,500	37,600	Hercules Powder	No	1,316,710	2.85	4.01	3.65	1.95
129½	130	123½	133½	126¼	135½	128½	160	2.470	6% cum. pfd.	100	96,194	6.00	66.38	60.87	35.31
29	29⅞	20¾	29	16⅝	29½	16⅝	14,100	46.900	Industrial Rayon	No	759,325	2.00	3.15	1.77	.24
23	25½	19½	47⅝	21¼	46¼	17½	3,300	17,800	Interchem.	No	290,320	1.60	2.47	4.10	.32
111	113¼	107	113	91	109½	90	390	2,970	6% pfd.	100	65,661	6.00	16.99	24.27	7.39
1⅝	2⅛	1¼	2½	1	3⅝	1½	5,000	35,000	Intern. Agricul.	No	436,048	...	—1.57	—1.32	—0.003
40⅛	49	30⅛	44	18½	41	16	1,600	23,400	7% cum. pfd.	100	100,000	...	.14	1,26	7.01
27¾	28½	23⅜	38⅞	19⅝	55¾	35	51,800	487,800	Intern. Nickel	No	14,584,025	2.00	2.30	2.39	2.09
46½	46½	38¼	39⅝	26⅞	38	29	1,000	9,200	Intern. Salt	No	240,000	2.50	3.98	1.92	2.29
22	22	17¾	23⅜	14⅝	22½	14½	400	7,400	Kellogg (Spencer)	No	509,213	1.60	...	1.39	.71
27¾	45⅜	26½	53⅝	30	56⅝	36½	19,100	141,500	Libbey Owens Ford	No	2,513,258	3.50	3.97	3.21	1.57
15⅞	16⅝	13	18⅝	10⅛	19	13½	4,000	41,700	Liquid Carbonic	No	700,000	1.00	1.72	1.62	1.81
29⅞	30½	24⅛	32⅝	21	37⅝	20⅝	6,700	32,300	Mathieson Alkali	No	828,171	1.50	1.72	1.12	1.01
91¾	92¾	77	119	79	114⅝	85⅝	6,600	53,200	Monsanto Chem.	No	1,241,818	3.00	4.04	3.81	2.35
116½	118½	112	119	110	121	110	100	2,130	4½% pfd. A.	No	50,000	4.50	57.38	54.29	31.51
122¾	123	115	122	113½	122½	112	500	2,370	4½% pfd. B.	No	50,000	4.50	57.38	54.29	31.51
18⅜	19	14½	22½	14⅛	27½	17⅞	19,200	137,700	National Lead	10	3,095,100	.87	1.34	1.23	.75
175½	176	168½	176	160	173⅛	152	400	3,900	7% cum. "A" pfd.	100	213,793	7.00	28.54	27.04	20.03
147	154	142	153¾	132	145	132	490	1,960	6% cum. "B" pfd.	100	103,277	6.00	59.46	55.30	35.97
32	32½	26	44	28¾	46	28½	1,900	19,100	National Oil Products	4	179,829	1.35	3.92	3.89	2.23
10⅝	11⅞	5⅝	14¼	6⅛	17⅝	8½	46,100	130.200	Newport Industries	1	621,359	.30	.50	.66	—.08
49⅞	50¾	38¾	64⅝	42	70	50	11,600	115,100	Owens-Illinois Glass	12.50	2,661,204	2.00	2.71	3.17	2.02
59¾	60¼	50⅛	71¾	53	66	50⅝	12,300	122,700	Procter & Gamble	No	6,409,418	2.75	4.37	3.80	2.50
117	120	115	118½	112½	119⅝	112	530	2,330	5% pfd.	100	169,517	5.00	336.78	298.55	101.81
14	15¾	10⅛	13⅛	7⅝	17¼	9⅞	20,700	181,300	Shell Union Oil	No	13,070,625	.75	1.05	.77	.70
31¾	33	18⅞	23¼	12¼	29½	15½	15,800	94,900	Skelly Oil	No	981,349	1.25	3.28	1.99	2.27
32⅝	34⅛	25½	29	20⅝	30	22¾	65,400	490.300	S. O. Indiana	25	15.272.020	1.50	2.20	2.24	1.82
43⅛	45⅝	33	46½	29⅞	53½	38	86,200	1,001,600	S. O. New Jersey	25	27,278,666	1.75	4.54	3.27	2.86
9⅛	9¼	7⅜	9¼	4⅛	9⅛	4	6,600	47,900	Tenn. Corp.	5	853,696	.25	1.36	.41	.40
42¾	44¾	34½	47⅝	33	50⅝	32½	52,500	440,200	Texas Corp.	25	10,876,882	2.00	2.90	3.02	2.13
37⅞	38½	31½	37¼	26⅞	38½	26	13,600	110,100	Texas Gulf Sulphur	No	3,840,000	2.50	2.38	2.04	1.81
78¾	79⅝	60	88⅝	59⅞	94¼	65½	35,400	334,400	Union Carbide & Carbon	No	9,277,288	2.30	4.55	3.86	2.77
50	50½	40⅞	65⅝	42½	69½	52	4,800	25,500	United Carbon	No	397,885	3.00	3.36	3.81	3.78
33	33½	20	28	14	29⅝	13½	30,100	84,300	U. S. Indus. Alcohol	No	391,238	...	2.73	1.06	—1.08
25⅝	34⅛	23	43⅞	25	40	16	11,400	110,500	Vanadium Corp. Amer.	No	425,708	1.50	2.85	3.25	.61
26½	26½	20	31½	19	29⅝	18¼	2,500	14,400	Victor Chem.	5	696,000	1.40	1.45	1.59	1.05
1¾	2½	1½	4½	1⅝	5⅝	2½	3,400	21,300	Virginia-Caro. Chem.	No	486,122	...	—1.36	—1.57	—1.80
24¾	28¾	19¼	31¾	14	33¾	17	3,800	28,200	6% cum. part. pfd.	100	213,052	...	2.89	2.41	1.90
32¼	36½	27¼	38½	27⅝	39¼	15¾	1,800	10,500	Westvaco Chlorine	No	353,152	1.85	2.96	2.91	1.52
111	112	105	109⅞	106	...	...	750	5,050	cum. pfd.	No	59,885	4.50	21.98	...	...
NEW YORK STOCK EXCHANGE															
41⅝	42⅜	31	39⅞	26	35¾	18⅝	23,100	209,100	Amer. Cyanamid "B"	10	2,618,387	1.10	2.44	2.07	.91
127½	134	107	134⅞	98	112¾	76	1,375	11,450	Celanese, 7% cum. 1st pfd.	100	148.179	9.72	35.25	35.73	8.95
6	6⅜	4	6⅝	2⅝	6¾	3	2,300	12,525	Celluloid Corp.	15	194.952	...	—.29	.70	—2.73
7¼	7¾	6⅜	8⅛	5	9¼	5	800	9,300	Duval Texas Sulphur	No	500.000	.75	1.16	1.25	.71
83½	86	65	92	60	68	30	400	5,025	Heyden Chem Corp.	100	125.497	3.00	6.26	5.98	2.07
81	96¼	78	104	65	117	90	3,300	44,400	Pittsburgh Plate Glass	25	2.188.040	5.00	6.30	4.94	3.00
83½	84	65	100	62½	113½	81	3,800	33.250	Sherwin Williams	25	638.927	3.00	6.57	5.96	2.43
112	115½	109	114¾	106	116	106½	230	2,310	5% cum. pfd.	50	122,289	5.00	39.49	35.08	8.76
PHILADELPHIA STOCK EXCHANGE															
178	182	162	192	158¾	179	135	25	1,975	Pennsylvania Salt	50	150,000	9.00	...	10.52	6.29

Last (August 1941)	High (August 1941)	Low (August 1941)	1940 High	1940 Low	1939 High	1939 Low	Sales August 1941	Sales 1941	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
102½	104½	100⅝	105¼	100⅛	103⅝	98	354,000	2,094,000	Amer. I. G. Chem. Conv.	1949	5½	M-N	$22,400,000
32	35	26⅛	41	27½	41½	19	14,000	320,000	Anglo Chilean Nitrate inc. deb.	1967	4½	J	10,400,000
30½	33½	25⅝	39⅝	27	37	21½	96,000	913,000	Lautaro Nitrate inc. deb.	1975	4	J-D	27,200,000
31	38	31	40	21	30	16	......	3,000	Ruhr Chem.	1948	6	A-O	1,500,000
98¼	99⅝	94⅜	100¼	93½	95⅝	88⅝	249,000	3,477,000	Shell Union Oil	1954	2½	J-J	85,000,000
105¼	106½	103⅝	107	101¼	106¼	97⅝	124,000	1,425,000	Standard Oil Co. (New Jersey) deb.	1961	3	J-D	85,000,000
105	105⅝	103	107	100⅝	106½	94¼	232,000	1,659,000	Standard Oil Co. (New Jersey) deb.	1953	2¾	J-J	50,000,000
106½	106⅞	102⅞	108¾	102	105⅞	95¾	97,000	1,101,000	Texas Corp.	1959	3	A-O	40,000,000

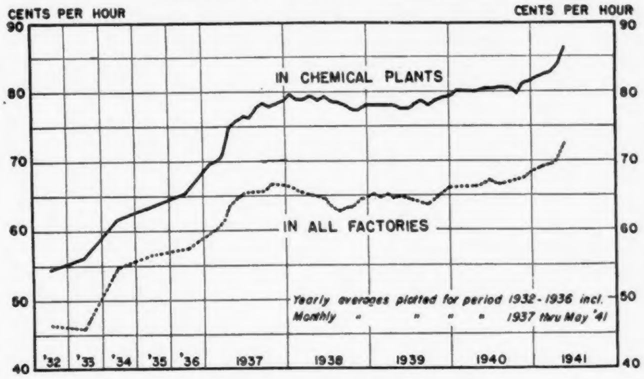
* Including extras paid in cash.
** For either fiscal or calendar year.

Statistical Trends of the Chemical Industry — p. 1

These graphs showing up-to-date trends of the chemical industry are reproduced through the courtesy of the Manufacturing Chemists' Association.

AVERAGE HOURLY EARNINGS

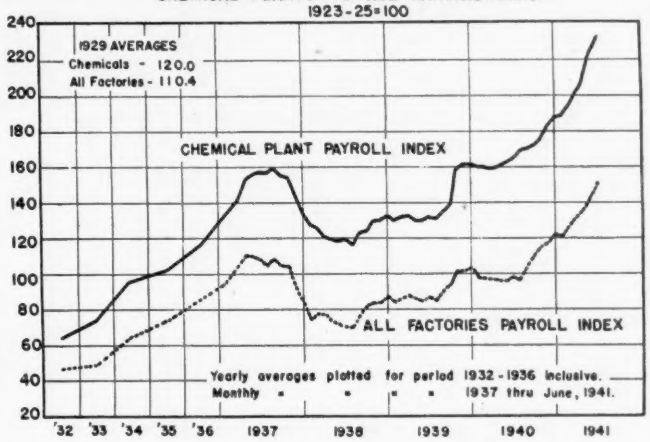
CHEMICAL PLANTS VS. ALL MANUFACTURING



INDEXES OF FACTORY PAYROLLS

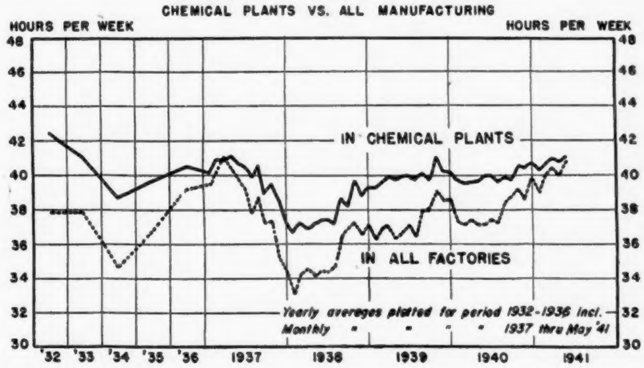
CHEMICAL PLANTS VS. ALL MANUFACTURING

1923-25=100



AVERAGE WEEKLY HOURS

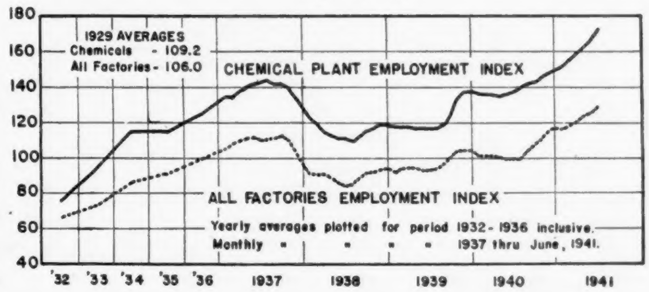
CHEMICAL PLANTS VS. ALL MANUFACTURING

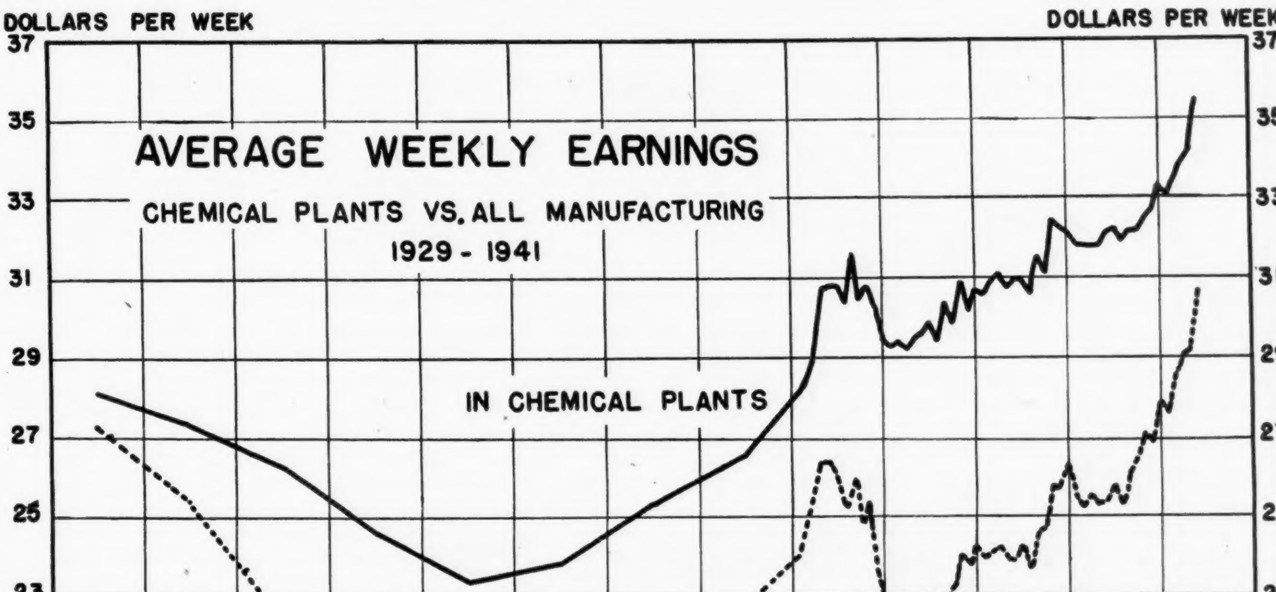


INDEXES OF FACTORY EMPLOYMENT

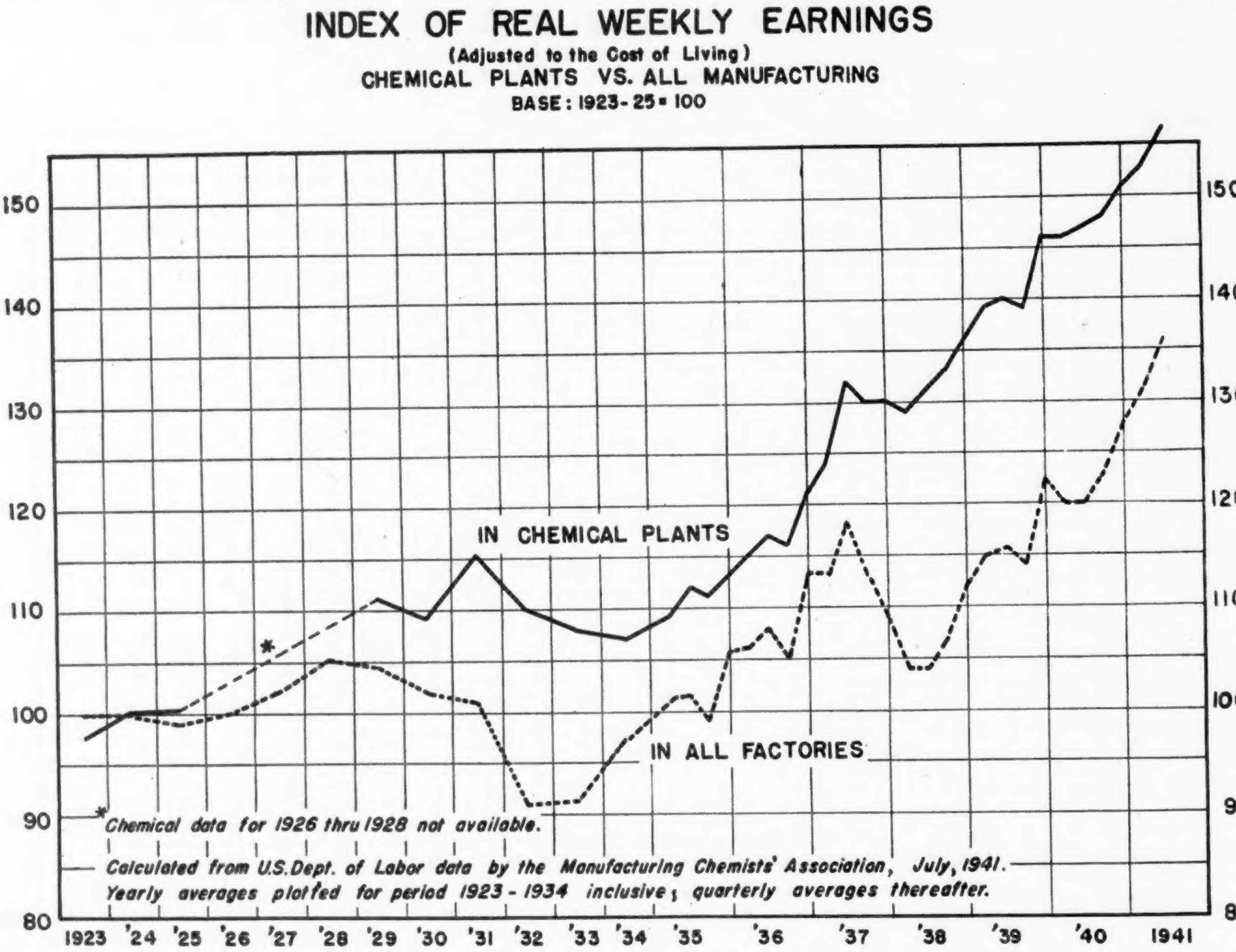
CHEMICAL PLANTS VS. ALL MANUFACTURING

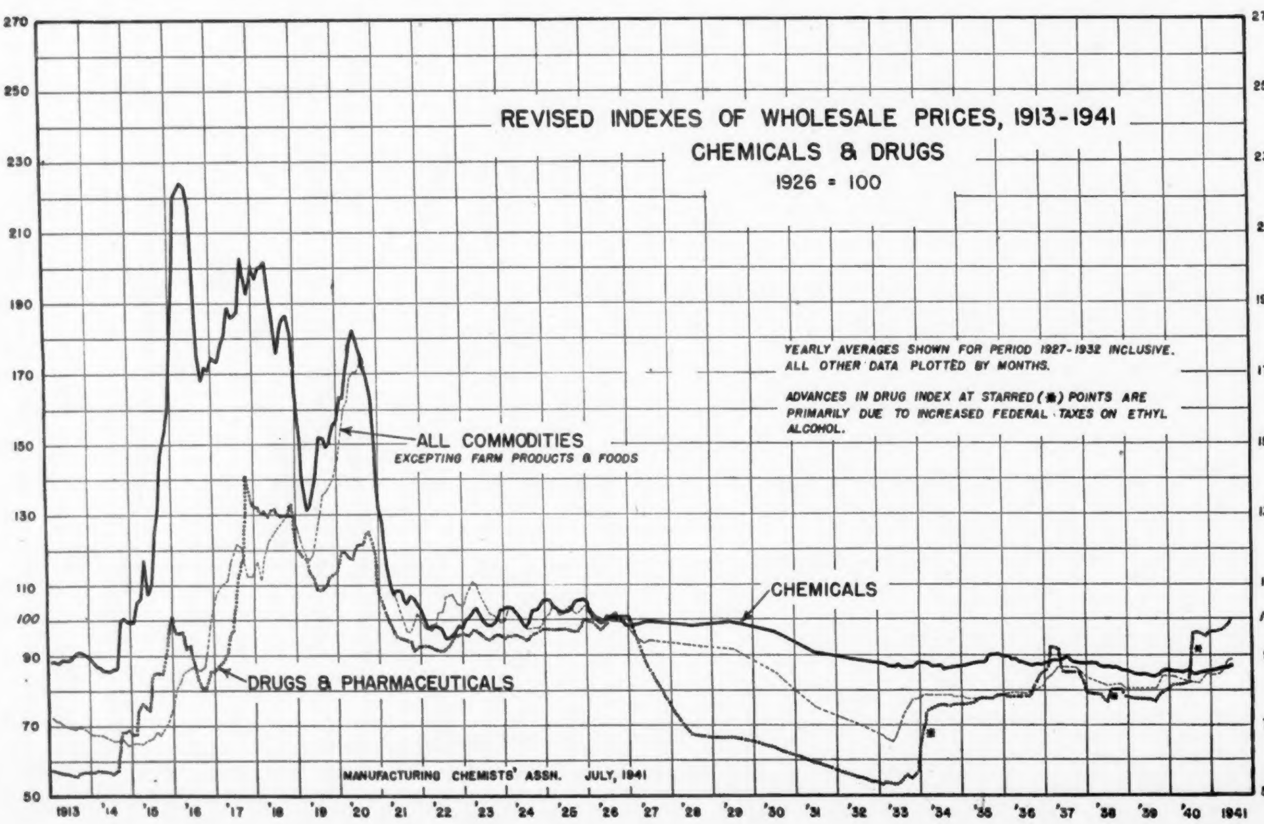
1923-25=100





Statistical Trends of the Chemical Industry — p. 2





New Trade Marks of the Month

AQUADYE
389,941

One Week
389,943

DOLE
389,965

POST
389,967

TEXBORD
419,658

CARDOLITE
430,278

20TH CENTURY
432,800

PENETROPE
435,884

SINKRITE
436,341

SOL-WET
438,061

WALNUT GROVE
438,226

MAR-CLENE
439,393

440,446

MARATHON
441,486

APCO
441,936

B-GON
442,408

BOYL-COTE
442,707

ETCHENE
442,708

COLLOFILM
443,210

443,264

ALUMEX
443,292

HYDRATEX
443,293

443,302

"WINKY"
443,363

LADELITE
443,517

VITAZYM
443,541

A-200 ECTOPARASITICIDE
443,831

PLURAVIT
443,906

STABILIDE
443,944

ULTRA-WASH
443,969

WAXHIDE
443,994

FLORISIL
444,145

OCTAR
444,158

DIPENTEK
444,183

PENTEK
444,184

SUPREME
444,212

Dhobi
444,220

BEDOME
444,231

CEDOME
444,232

KADOME
444,233

TRI-A
444,234

Trade Mark Descriptions

389,941. Aridye Corporation, Fair Lawn, N. J.; Feb. 25, 1939; for textile printing pastes and textile printing colors; since Feb. 9, 1939.

389,943. (Not subject to opposition) The Norwich Pharmacal Co.; Norwich, N. Y.; June 17, '40; for; concentrated vitamin A preparation; since June 3, '40.

389,965. Hawaiian Pineapple Co., Ltd., Honolulu, Territory of Hawaii and San Francisco, Calif; June 7, '41; for citric acid; since 1931.

389,967. The Frederick Post Co., Chicago, Ill.; June 11, '41; for developers and erasing fluids for blueprints; developers and erasing fluids for direct printing sensitized papers and cloths; silver-print and dye-line eradicators; transparentizing fluids for tracing papers and cloths; fixative compositions; since Jan. 10, 1936.

419,658. The Celotex Corp., Chicago, Ill.; May 22, '39; for latex adhesives and a latex adhesive and a dispersion fluid therefor sold in combination; since October, 1936.

430,278. The Harvel Corp., Irvington, N. J.; Apr. 2, '40; for raw or partly prepared materials made from cashew nut shell liquid; since Jan. 21, '35.

432,800. 20th Century Chemical Co., Camden, N. J.; June 7, '40; for chemical preparations; since Feb. 1, '37.

435,884. The Texas Co., N. Y., N. Y.; Sept. 11, '40; for oils and greases especially adapted for lubricating wire rope; since Aug. 21, '40.

436,341. Harbison-Walker Refractories Co., Pittsburgh, Pa.; Sept. 25, '40; for powder insulation for tops of ingot molds; since Aug. 24, '40.

438,061. California Spray-Chemical Corp.; Wilmington, Del.; and Richmond, Calif.; Nov. 19, '40; for detergents for washing fruit; since Aug. 24, '40.

438,226. Walnut Grove Products Co., Atlantic, Iowa; Nov. 25, '40; for vermifuges, insecticides, germicides and disinfectants; since May 28, '20.

439,393. J. E. Martin Equipment Corp.; Niagara Falls, N. Y.; Jan. 3, '41; for dry cleaning fluid; since Apr. 2, '40.

440,446. Caliste V. Wilson (Cottie-Wilson Laboratories) North Hollywood, Calif.; Feb. 8, '41; for colloidal sulfur solution; since June 8, '40.

441,486. The Peerless Carbon Black Co., Pittsburgh, Pa.; Mar. 12, '41; for black carbon pigment for use in the paint industry; since Jan. 14, '32.

441,936. Anderson-Prichard Oil Corporation, Oklahoma City, Okla.; Mar. 26, '41; for gasoline, kerosene, and industrial naphthas; since June, '21.

442,408. California Spray-Chemical Corp., Wilmington, Del.; and Richmond, Calif.; Apr. 9, '41; for parasiticides, insecticides, animal poisons, and animal repellents; since Mar. 27, '41.

442,707. Industrial Chemical Prods. Co., Detroit, Mich.; Apr. 18, '41; for mixture with an acid, such as a phosphoric acid, base to be applied to the surfaces of ferrous and non-ferrous metals to prepare the same for painting; since June, '40.

442,708. Industrial Chemical Prods. Co., Detroit, Mich.; Apr. 18, '41; for mixture with an acid, such as a phosphoric acid, base to be applied to the surfaces of ferrous and non-ferrous metals to prepare the same for painting; since Aug., '40.

443,210. Stein-Hall Mfg. Co., Chicago, Ill.; May 2, '41; for glues, adhesive gums, and adhesive pastes; since Oct. 1, '40.

443,264. Petrolite Corp., Ltd.; St. Louis, Mo.; May 5, '41; for chemical agent for inhibiting, preventing, and removing deposits of asphalt, wax, paraffin, organic materials, and the like in oil wells, oil collecting lines, tanks, and similar petroleum handling equipment; since Jan., '26.

443,292. J. M. Huber, Inc., N. Y., N. Y.; May 6, '41; for china clay; since Apr. 25, '41.

443,293. J. M. Huber, Inc.; N. Y., N. Y.; May 6, '41; for china clay; since Apr. 16, '40.

443,302. Orefraction Inc, Pittsburgh, Pa.; May 6, '41; for mineral abrasive powders; since May 14, '40.

443,363. C. M. Kimball Co., Boston, Mass, May 8, '41; for ammonia, deodorant, and bleach; since June 4, '40.

443,517. The Pyro Clay Prods. Co., Oak Hill, O.; May 12, '41; for refractory used in ramming, coating and spraying ladles in iron, malleable and blast furnace ladles and also used in cupola wells, spouts, troughs, breasts, etc., and in other types of furnaces and locations where slag is a condition of melting; since Jan. 27, '41.

443,541. The Wm. S. Merrell Co., Cincinnati, O.; May 13, '41; for vitamin-containing pharmaceuticals; since Jan. 15, '20.

443,831. Walter K. Angevine, Washington, D. C.; May 23, '41; for insecticide specially processed to allay irritation in the treatment of pediculosis, scaries and for the eradication of animal parasites, and their eggs, infesting the body; and for external use on both humans and domestic animals; since Apr. 25, '41.

443,906. Alba Pharmaceutical Co., Inc.; N. Y., N. Y.; May 26, '41; for compound vitamin preparation for the prevention and treatment of combined deficiencies of various vitamins; since May 1, '41.

443,944. Mallinckrodt Chem. Works, St. Louis, Mo.; May 26, '41; for stabilized assimilable iodide-containing substances; since May 16, '41.

443,969. The Atlantic Refining Co., Phila., Pa.; May 27, '41; for cleaner for automobile bodies; since Mar. 10, '41.

443,994. The Bell Co., Inc.; (Flare Labs.) Chicago, Ill.; May 28, '41; for soaps, washing solutions and cleaning compounds; since Jan. 15, '39.

444,145. Floridin Co., Warren, Pa.; June 3, '41; for absorbent magnesium silicate; since May 9, '41.

444,158. Old Coloy Tar Co., Inc.; Sparta, N. J.; June 3, '41; for road tar; since May 20, '41.

444,138. Heyden Chemical Corp.; N. Y., N. Y.; June 4, '41; for dipentaerythritol; since Jan. 24, '41.

444,184. Heyden Chemical Corp.; N. Y., N. Y.; June 4, '41; for pentaerythritol; since Dec. 12, '40.

444,212. John A. Becker (Gumputtie Laboratories), Chicago, Ill.; June 5, '41; for plastic compound for caulking, glazing, and sealing; since June 2, '41.

† Trademarks reproduced and descriibed include those appearing in *Official Gazette* of the *U. S. Patent Office*, Aug. 5 to Aug. 26, 1941.

New Trade Marks of the Month

ALL'OUT
444,273

KEN YA PYE
444,302

FYVEE
444,335

TENEE
444,336

PERFECT CIRCLE CLEANER
444,422

SPECTRATEX
444,439

FENOX
444,452

UNAFLO
444,479

ALBINOL
444,483

HI-IN-VI
444,579

RENEX
444,591

ELECTREX
444,612

FURNEX
444,613

chevinal
444,620

PERVINAL
444,621

STAN-TEST
444,660

FINEX
444,699

PENDRON
444,766

KELLSOY
444,773

NEO-SPECTRA
444,820

WF
444,846

LARVEX WF
444,847

RITE-TONERDE
444,851

CUMULUS
444,860

DELTALIN
444,875

VANADISET
444,886

SOAPETTES
444,896

CAR-O-MIZE
444,929

PHENOBOND
444,944

V. H. P. F.
445,015

EMULTEX
445,019

BEJECTAL
445,188

HYDROSORB
445,190

OZETTES
445,289

(Trade Mark Descriptions Continued)

444,220. Jack Hackman (National Cleaning Products Company), Columbus, O.; June 5, '41; for powder for use as a washing preparation; since Feb. 21, '41.

444,231. Sharp and Dohme, Inc.; Philadelphia, Pa.; June 5, '41; for pharmaceutical preparations; since May 28, '41.

444,232. Sharp & Dohme, Inc.; Philadelphia, Pa.; June 5, '41; for pharmaceutical preparations used in the treatment of and to avoid metabolic deficiencies, including preparations containing vitamins, including preparations containing vitamin C; since May 28, '41.

444,233. Sharp & Dohme, Inc.; Philadelphia, Pa.; June 5, '41; for pharmaceutical preparations; since May 28, '41.

444,234. Sharp & Dohme, Inc.; Philadelphia, Pa.; June 5, '41; for astringents, analgesics, antiseptics and ointments; since May 28, '41.

444,273. National Powder Extinguisher Corp.; Jersey City, N. J.; June 6, '41; for fire extinguishing compounds; since May 29, '41.

444,302. Greene Trading Co., Inc.; N. Y., N. Y.; June 7, '41; for pyrethrum; since Apr. 24, '41.

444,335. General Mills, Inc.; Minneapolis, Minn.; June 9, '41; for fortified wheat germ oil; since May 23, '41.

444,336. General Mills, Inc.; Minneapolis, Minn.; June 9, '41; for fortified wheat germ oil; since May 23, '41.

444,422. William H. Taylor, Birmingham, Ala.; June 11, '41; for cleaning compound useful in cleaning rubber articles such as floors, rubber mats, automobile tires; since May 1, '41.

444,439. Columbian Carbon Co., N. Y., N. Y.; June 12, '41; for particulate carbon having a general use in the industrial arts; since Apr. 24, '41.

444,452. Halowax Corp., N. Y., N. Y.; June 12, '41; for plastic sealing compounds; since Jan. 6, '41.

444,479. Universal Atlas Cement Co., New York, N. Y.; June 12, '41; for oil well cement; since June 3, '41.

444,483. Albi Chemical Corp.; N. Y., N. Y.; June 13, '41; for chemical compounds for impregnating fibrous, cellulosic and textile material to make same mildew-proof; since May 21, '41.

444,579. The Penslar Co., Detroit, Mich.; June 16, '41; for fitamin product; since June 9, '41.

444,591. Atlas Powder Co., Wilmington, Del.; June 17, '41; for emulsifying, wetting, and dispersing agents; since May 28, '41.

444,612. Southern Carbon Co., Monroe, La.; June 17, '41; for particulate carbon having a general use in the industrial arts; since May 14, '41.

444,613. Southern Carbon Co., Monroe, La.; June 17, '41; for particulate carbon having a general use in the industrial arts; since Dec. 31, '40.

444,620. U. S. Vitamin Corp.; N. Y., N. Y.; June 17, '41; for vitamin-mineral supplement for horses in training; since Aug. 10, '40.

444,621. U. S. Vitamin Corp., N. Y., N. Y.; June 17, '41; for vitamin-mineral supplement for dogs and small breed animals; since Aug. 10, 40.

444,660. Standard Oil Company of Calif.; Wilmington, Del. and San Francisco, Calif.; June 18, '41; for cleaning solvents for general household, professional, and commercial cleaning; since May 9, '41.

444,699. General Aniline & Film Corp.; N. Y., N. Y.; June 20, '41; for chemicals and preparations and compounds thereof used in photographic processes, particularly photographic developers; since May 29, '41.

444,766. Nutrition Research Laboratories; Chicago, Ill.; June 23, '41; for vitamin preparations, particularly medicinal dosages in capsule form of vitamins A, B, D, and G; since June 18, '41.

444,773. Spencer Kellogg and Sons, Inc.; Buffalo, N. Y.; June 23, '41; for drying oils as or in coating compositions and specifically a modified soybean oil; since June 5, '41.

444,820. Columbian Carbon Co.; N. Y., N. Y.; June 25, '41; for particulate carbon having a general use in the industrial arts; since Jan. 15, '35.

444,846. Zonite Products Corp.; N. Y., N. Y.; June 25, '41; for moth-proofing composition; since Apr. 9, '41.

444,847. Zonite Products Corp.; N. Y., N. Y.; June 25, '41; for moth-proofing composition; since Apr. 9, '41.

444,851. Conrad Wolff; Irvington, N. J.; June 26, '41; for metal polish consisting of a precipitated alumina used for polishing metal to determine the graining thereof; since June 17, '41.

444,860. The Cumulus Co.; Peru, Ind.; June 26, '41; for soap powder; since Oct. 1, '36

444,875. Eli Lilly and Co.; Indianapolis, Ind.; June 26, '41; for concentrates containing vitamin D; since June 2, '41.

444,866. P. J. Wilson (Wilson Carbon Co.); N. Y., N. Y.; June 26, '41; for resin; since May 27, '41.

444,896. Club Aluminum Products Co.; Chicago, Ill.; June 27, '41; for soap impregnated metallic wool; since May 29, '41.

444,929. Chemical Products Corp of Amer.; Chicago, Ill.; June 28. 41; for automobile washing preparation; since Apr. 1, '41.

444,944. Sandpaper, Inc.; Waltham, Mass.; June 28, '41; for coated abrasives; since June 16, '41.

445,015. Miller Chemical and Fertilizer Corp.; Baltimore, Md.; July 2, '41; for water soluble fertilizer; since May 1, '41.

445,019. A. E. Staley Mfg. Co.; Decatur, Ill.; July 2, '41; for concentrated vegetable protein for stabilizing asphalt or petroleum emulsions; since May 20, '41.

445,188. Abbott Laboratories; N. Chicago, Ill.; July 9, '41; for injectable solution of vitamin B Complex components; since June 20, '41.

445,190. Abbott Laboratories; N. Chicago, Ill.; July 9, '41; for ointment base; since June 20, '41.

445,289. The G. F. Harvey Co.; Saratoga Springs, N. Y.; July 12, '41; for medicinal preparation—namely, a vaginal suppository consisting of a solution of triolein oxonide in olive oil hermetically sealed and encapsulated in gelatin capsule form.

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A Complete Check—List of Products, Chemicals, Process Industries

Agricultural Chemicals

Solution prepared for use in ammoniating acid fertilizer materials comprising the product obtainable by mixing formaldehyde, a urea, water, and ammonia, the ammonia being present in the proportions of at least 1 mole of ammonia per mole of formaldehyde. No. 2,255,026. Frank G. Keenen and Ward H. Sachs to E. I. du Pont de Nemours & Co.

Fertilizer nitrifying solution prepared for use in ammoniating acidic fertilizer materials containing a urea comprising the product obtainable by mixing formaldehyde, ammonium nitrate, water and ammonia. No. 2,255,027. Frank G. Keenen and Ward H. Sachs to E. I. du Pont de Nemours & Co.

Cellulose

Cellulose Hydrate Strips. Process manufacture water proof strips consisting in coating a sheet of regenerated cellulose with a water repellent layer which is formed by coating with an emulsion of urea formaldehyde resin, alkyd the excess emulsion, drying the cellulose so coated and finally heating the same for three minutes at a temperature of from two hundred to three hundred degrees centigrade. No. 2,251,270. Emil Czapek to Guaranty Trust Co. of New York.

Regenerated Cellulosic Pellicle sprayed with solution consisting of 16 parts stearic acyloin dissolved in 100 parts of toluene at such a rate that approximately 10 grams of solution are applied per square meter of surface, and thereafter drying. No. 2,251,752. James A. Mitchell to E. I. du Pont de Nemours & Co.

Bodying Drying Oils with cellulose ethers. No. 2,252,527. Joseph L. Sherk and Norman R. Peterson to The Dow Chemical Co.

Cellulose and Cellulosic fibers and products. Method of treating and finishing. No. 2,252,730. Eric O. Widgway and Frederick C. Tucker to Ridbo Laboratories, Inc.

Cellulose Solution of low ammonia content. Method of preparing. No. 2,252,731. Eric O. Ridgway and William A. Bodenschatz to Ridbo Laboratories, Inc.

Cellulosic Compositions of matter containing organic ester amides. No. 2,253,064. Joseph B. Dickey and James G. McNally.

Plasticized Cellulose derivative compositions. No. 2,253,065. Joseph B. Dickey and James B. Normington to Eastman Kodak Co.

Cellulose Sheets and Films. Process for producing. No. 2,253,157. Richard Weingand and Irene Koberne to Sylvania Industrial Corp.

Gelatinous Solutions of Cellulose Compounds. No. 2,253,297. Albert A. Houghton and James Craik to Imperial Chemical Industries, Ltd.

Bleaching and Scouring unfinished cellulosic fabrics. No. 2,253,368. Archie L. Dubeau to The Mathieson Alkali Works, Inc.

Esterification of cellulose. No. 2,253,724. Archibald A. New, Dudley R. Beckwith and William Wiltshire to International Standard Electric Corp.

Cellulosic Materials. Process for softening. No. 2,253,773. Kurt Engel and Kurt Pfaehler to J. R. Geogy A. G.

Production of regenerated cellulose film having substantially no permanent shrinkage and which is smooth, glossy and free from wrinkles. No. 2,254,200. Francis P. Alles to E. I. du Pont de Nemours & Co.

Method of Preparing Cellulose Esters of aliphatic acids of 10-18 carbon atoms which comprises reacting upon a cellulosic material containing esterifiable hydroxyl groups with a reaction mixture of sulfuric acid, comprising an impelling anhydride, a solvent, an aliphatic acid of 10-18 carbon atoms and phosphoric acid as the catalyst until a substantial amount but not all of the esterification has occurred, then adding sulfuric acid catalyst to the mass and completing the esterification. No. 2,254,652. Gordon D. Hiatt and Carlton L. Crane to Eastman Kodak Co.

Laminated Insulation Sheet comprising a layer of soft fluffy wadding formed of a plurality of superimposed plies of loosely integrated cellulose material. No. 2,254,856. Meredith S. Randall to Woodal Industries, Incorporated.

Cellulose derivatives, polyvinyl compounds or polymerized acrylic esters. No. 2,254,904. William H. Moss to Celanese Corp. of America.

Ceramics, Refractories

Glass Batch for producing colorless, transparent glass of soda-lime type, comprising a material containing tellurium and sufficient of a material selected from the group consisting of arsenic and antimony oxides to prevent the tellurium from discoloring the glass. No. 2,252,131. Aaron K. Lyle to Hartford-Empire Co.

Refractory comprising about 50 to about 80% by weight of material of the group consisting of magnesium orthosilicate and materials rich in such silicate substantially wholly in the form of granules of at least about 0.2 mm. size, and about 20 to about 50% by weight of refractory material other than said silicate in the form of particles less than about 0.2 mm. size and containing not over about 25% of said orthosilicate and materials productive of it, the refractory being characterized by high resistance to spalling and to load at high temperatures in the fired or burned condition. No. 2,252,317. Victor Moritz Goldschmidt.

Sized Ceramic Product. No. 2,252,427. Earnest T. Hermann.

Glass of high softening point, at least as high as 1000°C. No. 2,252,466. Walter Hanlein to General Electric Co.

Vitreous Composition. No. 2,252,495. Werner Dusing to General Electric Co.

Vitreous Enamel Opacifier. No. 2,252,588. Robert J. Whitesell to Rohm & Haas Co.

Chrome Refractory brick and the method of manufacture thereof. No. 2,253,620. Russell P. Heuer to General Refractories Co.

Magnesia Coated Refractory Particles and the preparation thereof. No. 2,253,955. Gustav A. Hebbe and Ralph E. Gibbs to J. E. Baker Company.

Composition of Matter comprising particles of non-fibrous actinolite and a binder. No. 2,254,301. Franklin A. McCann to The Pacific Clay Products Co.

Vitreous Composition whose analysis is expressed as: Zinc oxide 40 to 60%, Boric anhydride. 40 to 60%, and a stabilizer introducing from 0.5 to 2.5% beryllium, based on the batch. No. 2,254,633. Edgar D. Tillyer, Harold R. Moulton and Townsend M. Gunn to American Optical Co.

Chemical Specialty

Stabilization of Shortening by incorporating therewith a monobasic sugar acid. No. 2,251,485. Donald P. Grettie to Industrial Patents Corp.

Embedding Mass comprising an ammonium phosphate in addition to the customary solid ingredients which mainly consist of plaster of Paris and siliceous materials. No. 2,251,610. Alex Rost-Grande to Winthrop Chemical Co., Inc.

Germicidal and Detergent soap composition exhibiting effective germicidal activity and possessing effective detergent and washing properties. No. 2,251,934 and 2,251,935. Walter H. Hartung to Sharp & Dohme, Inc.

Insulating Bat of glass wool treated with material consisting of a hydrocarbon oil as lubricant and polymerized urea formaldehyde as stiffening agent. No. 2,252,157. William M. Bergin and Allen L. Simison to Owens-Corning Fiberglas Corp.

Cheese Plasticizing Agent. No. 2,252,170. Henry H. Doering.

Parasiticidal Composition. No. 2,252,548. Joseph H. Borglin to Hercules Powder Co.

Fluorescent Screen comprising a metal sulfide and another sulfur compound having a sulfur-bearing radical which acts as an inhibitor of dissociation of the metal sulfide. No. 2,252,590. Henry Wolfson to Western Electric Co., Inc.

Ink and method of manufacturing same. No. 2,252,702. Joseph G. Curado to General Printing Ink Corp.

Quick Drying Printing Ink and method of preparation. No. 2,252,917. Joseph G. Curado to General Printing Ink Corporation.

Friction Element composed of major proportions by weight of fibrous asbestos and oxidation products of iron in binding relationship therewith. No. 2,252,991. Rudolph E. Steck to Raybestos-Manhattan, Inc.

Germicidal Preparation having an enhanced bactericidal effectiveness comprising an aqueous dispersion of a germicidal substance of the class consisting of alpha-termineol and pine oil and a halogenated phenolic body having germicidal properties. No. 2,253,182. Emil Klarmann to Lehn & Fink.

Treating Furs with solution containing phthalic anhydride and furfuryl alcohol at a temperature of 85-90°F. so as to form furfuryl phthalate in or upon the surface of the material so treated. No. 2,253,192. Oscar F. Muller and Robert G. Schwarz, Jr. to Dri-Wear, Inc.

Aqueous Starch Mixtures. Apparatus for boiling same. No. 2,253,262. George M. Bierly.

Animal Feed Products. No. 2,253,319. Herman E. Batterman to Dry Molasses Feed Co.

Jelly. Method of gelling an aqueous liquid with pectin to form slightly alkaline, stable, pectin-gelled product. No. 2,253,389. Nathan M. Nnookin to Speas Co.

Embalming Fluid containing a small amount of an alkyl ester of a dibasic acid said ester acting as a blood anticoagulant and facilitating the passage of said fluid through body capillaries and tissues during an embalming operation. No. 2,253,625. Hilton I. Jones to National Selected Morticians.

Algicide comprising a water-soluble form of a halogenated monocyclic phenol having not less than three halogen atoms in the molecule, two halogen atoms of which are in adjacent positions on the benzene nucleus, which algicide is adapted for the control of algae, protozoa and slime growth. No. 2,253,762. Thomas S. Carswell and Howard K. Nason to Monsanto Chemical Co.

Germicide comprising a dilute alcoholic solution of equal parts of phenol and oil of thyme. No. 2,254,129. Frederick W. Ames.

Treating Milk Waste materials including precipitating the protein and fat solids of a milk waste in the presence of bentonite, separating the precipitate from the liquid effluent and utilizing said separated precipitate as a milk waste by-product. No. 2,254,241. Ernest E. Pittman and Robert R. Bottoms to The Girdler Corp.

Method of Making an Adhesive which is liquid and tacky in its unset state at atmospheric temperatures from rubber, rosin and pitch. No. 2,254,321. Seymour G. Saunders and Harry Morrison to Chrysler Corp.

Leakage Indicator for application to the surfaces of liquid handling equipment adapted when dry, to detect leakage of a contained liquid selected from a class consisting of oil and water immediately after its occurrence, which comprises a composition including a pigment, a binder, and a dye soluble in the contained liquid suspended in a vehicle in which the dye is insoluble, at least a portion of said dye being instantly dissolvable by escaping liquid to stain leakage immediately upon its occurrence. No. 2,254,609. William W. Kinzer to Armstrong Cork Co.

Abrasive Article. A screenable, pourable, dry granular mix consisting of abrasive granules each coated with only rubber as an organic bond with sulfur and a filler of inert material to the extent of at least 25% by volume of the bond (rubber, sulfur and filler). No. 2,254,612. Richard H. Martin to Norton Co.

Medicinal Product. Temporary skin substitute for application to abrasions, cuts and open sores containing a base material in the form of an inorganic pigment from the group consisting of lead oxide, zinc oxide and zinc resinate, a drying oil which has been heated and maintained at a temperature sufficiently long so that upon cooling it will surface harden; a solvent for the drying oil and a topical medicinal substance; the product being normally semi-fluid until exposed to the air; then surface hardening to scablike consistency in about one hour. No. 2,254,636. Verl D. Vangunten.

Insect Repellent having as its essential active ingredient a primary aliphatic alcohol having from ten to fourteen carbon atoms. No. 2,254,665. Anderson W. Ralston and John P. Barrett to Armour and Co.

Ink comprising about 20.9% pigment by weight, about 4.2% mineral filler by weight, about 1.2% argentic oxide by weight, and about 73.7% glycerine by weight. No. 2,254,865. John C. Wilson to Westinghouse Electric & Manufacturing Co.

Non-corrosive Aqueous Composition comprising an aqueous solution of an electrolyte which alone is corrosive and a 0.02 to 2% by weight

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of an azide selected from the group consisting of sodium azide, potassium azide, barium azide and tetra-methylammonium azide in which a buffering agent is added having a pH of approximately 7.3. No. 2,254,940. Gunther Endres.

Process Enhancing Color of citrus fruits. No. 2,255,025. Ralph H. Higby to California Fruit Growers Exchange.

Semi-solid Peanut Butter containing a tasteless and odorless petroleum wax as a filler and binder, said wax having a color resembling the color of peanut butter. No. 2,255,032. Henry Weisgurt and Dale R. Van Horn to said Weisgurt.

Coal Tar Chemicals

Cinnamic Acid esters and amides. No. 2,251,287. William A. Lott to E. R. Squibb & Sons.

1-aminoanthraquinine-2-sulfonic Acid Compound and preparation thereof by sulfonating an amino-anthraquinone compound in which an amino group is in the 1-position and the 2-, 3-, and 4-positions are unsubstituted. No. 2,251,688. James Ogilvie and Robert C. Hoare to National Aniline & Chemical Co. Inc.

Capillary Active compounds and process of preparing them. No. 2,251,892. Ludwig Orthner, Hans Keller and Heinz Sonke to I. G. Farbenindustrie Aktiengesellschaft.

Sulfo-acetic Acid Esters of randomly halogenated alcohols of the class consisting of lauryl alcohol and mixtures of higher alcohols comprising largely lauryl alcohol. No. 2,251,932. Benjamin R. Harris and Frank J. Cahn to The Emulsol Corp.

Resin-forming unsaturated light oil hydrocarbon, process for purification thereof. No. 2,251,938. Claude W. Jordan to The United Gas Improvement Co.

Tertiary Alcohols of the cyclopentano polyhydro phenanthrene series wherein the tertiary carbon is situated in the nucleus. No. 2,251,-939. Josef Kathol to Schering Corp.

Sulfonic Derivatives corresponding to formula $RO\text{-}(alk\text{-}NY)_m\text{-}CO\text{-}Z$, where R is from group consisting of acyl, alkyl, and substituted alkyl radicals containing at least 4C atoms, alk is member from group of hydrocarbon radicals and substitution products thereof, Y is from group of hydrogen, alkyl, cycloalkyl, alkoxyl, aralkyl, aryl and alkylol, -CO-Z is carboxylic acyl radical of aliphatic sulfo-polycarboxylic acid, $_m$ is a whole number. No. 2,251,940. Morris Katzman to The Emulsol Corp.

Thyroxin-O-Ether of the general formula $C_{15}H_9O_4NI_4RR'$ where R is an alkyl and R' is member of group consisting of hydrogen and alkyl radicals. No. 2,252,230. Arnold Loeser to Schering Corp.

Cyclic Amidine. No. 2,252,721. Karl Miescher Ernst Urech and Willi Klarer to Ciba Pharmaceutical Products, Inc.

Amino Acid Amidines and process of preparing same. No. 2,252,722. Karl Miescher and Willi Klarer and Ernst Urech to Ciba Pharmaceutical Products, Inc.

2-(chloromethyl)-imidazoline forming a hydrochloride of melting point 185-190°C. No. 2,252,723. Karl Miescher and Willi Klarer and Ernst Urech to Ciba Pharmaceutical Products, Inc.

Dinitroaminopyrenes. Process for manufacture. No. 2,253,555. Peter G. Carter and John L. Grieve to Imperial Chemical Industries, Ltd.

Halogenated Metal Phthalocyanine. No. 2,253,560. Stanley R. Detrick and Kenneth C. Johnson to E. I. du Pont de Nemours & Co.

Polycarbonyl Compounds of the cyclopentanopolyhydrophenanthrene series. No. 2,253,798. Karl Miescher and Werner Fischer to Ciba Pharmaceutical Products, Inc.

2-Aminopyrimidine. Method preparing. No. 2,254,186. Elmore Hathaway to American Cyanamid Co.

Preparing Higher Molecular Urethanes comprises heating a higher molecular chlorcarbonic acid ester and adding thereto a finely divided ammonium salt of a weak acid which liberates ammonia under the conditions of the reaction and continuing the reaction under heat until the reaction goes substantially to completion. No. 2,254,283. Wolfgang Gundel to Heberlein Patent Corp.

Aromatic Organic Compound. No. 2,254,354. John S. H. Davies to Imperial Chemical Industries, Ltd.

Acids of the Cyclopentaro Polyhydro Phenoanthrene Series and their derivatives and a method of producing the same. No. 2,254,407. Hans-Georg Allardt and Lothar Strassberger to Schering Corp.

Coatings

Wrapping Tissue comprising a glycerinated water-sensitive, non-fibrous, cellulosic base, a moistureproofing surface coating and an intermediate coating. No. 2,252,091. Philipp Muller and Otto Herrmann to E. I. du Pont de Nemours & Co.

Process of curing a surface covering composition including a siccative material selected from the group consisting of drying oils and drying oil modified polyhydric alcohol-polybasic acid resins, the step which comprises adding to such a composition a dihydrocarbon-substituted cyanamid containing not more than 14 carbon atoms in the substituent groups. No. 2,252,386. Richard O. Roblin, Jr. to American Cyanamid Co.

Process of curing a surface covering composition including a siccative material selected from group consisting of drying oils and drying oil modified polyhydric alcohol-polybasic acid resins the step which comprises adding to such a composition a water-insoluble metal cyanamide which is substantially stable in the presence of water. No. 2,252,394. Coleman R. Caryl to American Cyanamid Co.

Process of curing a surface covering composition including a siccative material selected from the group consisting of drying oils and drying oil modified polyhydric alcohol-polycarboxylic acid resins, the step which comprises adding to such a composition a guanide. No. 2,252,396. Walter W. Durant to American Cyanamid Co.

Process of curing a surface covering composition including a siccative material selected from the group consisting of drying oils and drying oil modified polyhydric alcohol-polycarboxylic acid resins, the step which comprises adding to such a composition a guanidine salt. No. 2,252,397. Walter W. Durant to American Cyanamid Co.

Process of curing a surface covering composition including a siccative material selected from the group consisting of drying oils and drying oil modified polyhydric alcohol-polycarboxylic acid resins, the step which comprises adding to such a composition a salt of guanyl urea. No. 2,252,398. Walter W. Durant to American Cyanamid Co.

Process of curing a surface covering composition including a siccative material selected from the group consisting of drying oils and drying oil modified polyhydric alcohol-polycarboxylic acid resins, the step which comprises adding to such a composition an unsaturated nitrile. No. 2,252,399. Walter W. Durant to American Cyanamid Co.

Coating Composition consisting of about 90% chlorinated isobutylene polymers containing about 50% chlorine and about 10% of chlorinated paraffin wax containing about 30% chlorine. No. 2,252,485. Carl M. Hull to Standard Oil Co.

Coating Composition; flexible, glossy, flame-resistant and waterproof. No. 2,252,486. Maurice H. Arveson to Standard Oil Co.

Luminescent Coating. No. 2,252,552. Chester J. Calbick and John C. Cook to Bell Telephone Laboratories, Inc.

Coating Material consisting of a solution of oil-free phenol formaldehyde resin containing from 10% to 45% by volume of the resin of an inert, non-fibrous, suspensible, inorganic pigment. No. 2,253,-235. Charles H. Hempel to Heresite & Chemical Company.

Coating. Method producing a polished water-resistant surface coating upon porous articles of stone, brick, tile, wood, plaster, and the like, which comprises pretreating said surface with an alkaline solution adapted to penetrate such surface and to act upon and immobilize an ester of silicic acid when contacted therewith, applying to the thus treated surface of such article a preservative layer of a polishing liquid essentially comprising at least one ester of silicic acid adapted to hydrolyze and deposit a hydrated silica; water; and a solvent for the ester; and thereafter vigorously rubbing the polishing liquid containing the resultant deposit of hydrated silica into the surface of said article, in the presence of a small amount of a lubricant, until a highly polished water-resistant coating is formed upon the surface of said article. No. 2,253,587. Noel Shaw to Carbide & Carbon Chemicals Corp.

Transparent Flexible Film comprising essentially cellulose acetate of about 56% combined acetic acid content and isobutylene glycol in the ratio 22.5:7.5 by weight. No. 2,253,821. William D. R. Straughn to E. I. du Pont de Nemours & Co.

Protective Composition. As a new product, sodium pyroantimonate silicate. No. 2,254,471. Domenico Cascio.

Dyes, Stains

Oxatricarbocyanine Dyes and process for preparing them. No. 2,251,-286. Grafton H. Keyes to Eastman Kodak Company.

Dyestuffs. Compound of class consisting of di-alkylamino-dibenzanthrones and dialkylolamino-dibenzanthrones. No. 2,251,558. Myron S. Whelen to E. I. du Pont de Nemours & Co.

Intermediates. A dialkylamino-dibenzanthronyl. No. 2,251,559. Myron S. Whelen to E. I. du Pont de Nemours & Co.

Dyestuff of anthraquinone series which dyes cotton from usual hydrosulfite vat in green-olive shades of excellent fastness properties. No. 2,251,566. Donald P. Graham to E. I. du Pont de Nemours & Co.

Azo Dye. No. 2,251,813. Byron L. West, and Dale R. Eberhart to American Cyanamid Co.

Azo Compounds and materials. No. 2,251,921. Joseph B. Dickey and John R. Byers, Jr. to Eastman Kodak Co.

Azo Compound and material colored therewith. No. 2,251,946. James G. McNally and Joseph B. Dickey to Eastman Kodak Co.

Soluble Salts of wool dyestuffs easily soluble in water. No. 2,253,828. Samuel von Allmen and Edmond Rosselet to Sandoz Ltd.

Triazo Dyestuffs. No. 2,252,824. Hermann Winkeler, Albert Petz, Mannheim W. Keller and Ludwig Neumann to General Aniline & Film Corp.

Mono-Azo Dyestuffs insoluble in water but very easily soluble in organic solvents and yielding orange, red and brown shades of good fastness. No. 2,252,843. Ernst Fischer to General Aniline & Film Corp.

Azo Dyestuff insoluble in water which when prepared on the vegetable fiber clear bluish red shades of good fastness to washing and boiling and very good fastness to light. No. 2,252,844. Ernst Fischer and Ernst Heinrich to General Aniline & Film Corp.

Anthraquinone Dye Compounds containing in an a-position at least once in their molecule a nitroalkylamino group which is joined directly to the anthraquinone nucleus through the nitrogen atom of the amino portion of said nitro-alkylamino group and in which the nitro group is separated from the said nitrogen atom by at least two carbon atoms. No. 2,253,082. James G. McNally and Joseph B. Dickey to Eastman Kodak Co.

Sulfur Dye intermediate and a sulfur dye. No. 2,253,166. Newell M. Bigelow and John E. Cole to E. I. du Pont de Nemourse & Co.

Dyeing, process for improving dyeing properties of textile materials. No. 2,253,457. Croyden M. Whittaker, Cheadle Hulme, Clifford C. Wilcock to Courtaulds Ltd.

Method of staining wood which comprises impregnating it with a composition comprising an organic solvent and an azo dyestuff soluble in the solvent having a sulfonic group in the form of its free acid. No. 2,254,372. Donovan E. Kvalnes to E. I. du Pont de Nemours & Co.

Diazo Pigment Color in which the radical of one component is a radical of a diamine of the 3-3'-diphenyl benzidine series and the radicals of the coupling components are the same members of a group consisting of radicals of azo dye coupling components having an active methylene group in a tautomeric enol form, said pigments being devoid of solubilizing groups. No. 2,254,395. Swanie S. Rossander and Harold E. Woodward to E. I. du Pont de Nemours & Co.

Orthodihydroxy Azo Dyestuffs. No. 2,254,602. Richard Fleischhauer, Paul Zervas and Adolf Muller to General Aniline & Film Corp.

Dyeing Fibrous Materials. Process therefor. No. 2,254,965. Walter Kling, Ernst Goette, Kurt Heide and Herbert Gerstner to "Patchein" Aktiengesellschaft zur Beteiligung an Patenten und sonstigen Erfindungsrechten aur chemische Verfahren.

Equipment and Apparatus

Thermoplastic Cement, apparatus for activating. No. 2,252,030. John W. Pratt and Hubert Boothroyd to United Shoe Machinery Corp.

Vacuum Sublimating apparatus. No. 2,252,052. Hendrik J. Meerkamp van Embden to Hartford National Bank and Trust Co.

Dialyzing Apparatus. No. 2,252,213. Max Skolnik.

Dust Recovery apparatus for chemical and waste heat recovery installations. No. 2,252,307. Fay H. Rosencrantz to Combustion Engineering Co., Inc.

Fractional Distillation of hydrocarbon oils. Apparatus therefor. No. 2,252,550. Leslie B. Bragg to Foster Wheeler Corp.

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Catalytic Apparatus. No. 2,252,667. Carleton H. Schlesman to Socony-Vacuum Oil Co., Inc.

Apparatus for Cementing Wells. No. 2,254,246. Domer Scaramucci to Oil Equipment Engineering Corp.

Apparatus for Flame Hardening. No. 2,254,306. Chester Mott and Malcolm L. Whaley to National Cylinder Gas Co.

Method of Flame Hardening. No. 2,254,307. Chester Mott and Malcolm L. Whaley to National Cylinder Gas Co.

Welding Thin silicon steel and the like. Apparatus for. No. 2,254,-314. Eo Reed to The American Rolling Mill Co.

Fractionating Tower. No. 2,254,370. William Kaplan to Cities Service Oil Co.

Adjustable Carbon Monoxide Alarm. No. 2,254,480. Joseph J. Guaragna.

In Apparatus for Dispensing Gaseous Oxygen from a storage vessel containing liquid oxygen, a light weight vaporizer comprising, in combination, an oxygen conduit disposed within and in heat exchange contact with a surrounding heating medium; and heat conducting means, essentially consisting of wire bunched in random fashion, within said conduit, said bunched wire being removably sealed to and in head conducting contact with the inner wall surface of said oxygen conduit and being so disposed within said conduit as to impede the flow of oxygen therethrough. No. 2,254,-587. Virgil C. Williams to The Linde Air Products Co.

Gas and Liquid Contact Apparatus. No. 2,254,600. Marvin W. Ditto to Emulsions Process Corp.

Acetylene Gas Generator. No. 2,254,995. Mont C. Chadbourne.

Equipment—Containers

Resistant Container suitable for bulk storage of aqueous acetic acid, said container having an inner surface of wood coated with an acetate of cellulose of acetyl value not less than about 58% calculated as acetic acid. No. 2,251,288. Robert W. Moncrieff and Alfred Richmond to Celanese Corp. of Amer.

Evaporation. Apparatus for distributing washing fluid on exposed surfaces of evaporating equipment. No. 2,251,317. Leroy G. Black to American Potash & Chemical Corp.

Fractionating Condensers. Art of selecting pre-determined fractions from fractionating condensers. No. 2,251,771. Glenn E. Wynn and Robert G. Huggins to Mid-Continent Petroleum Corp.

Separating Device for gas and liquid. No. 2,252,687. Robert S. Bassett to Sylvia Bassett.

Catalytic Reactor. No. 2,252,719. John W. McCausland to Universal Oil Products Company.

Removing Condensates from Gas. Process and apparatus therefor. No. 2,252,738-739. Herman J. Stoever to The United Gas Improvement Co.

Ray of Slow Neutrons. No. 2,253,035. Hartmut I. Kallmann and Ernst Kuhn to I. G. Farbenindustrie Aktiengesellschaft.

Liquid Clarifying apparatus. No. 2,253,500. Miguel Arango to Petree & Dorr Engineers, Inc.

Apparatus for Controlling Chemical Reactions. No. 2,253,510. George S. Dunham to Houdry Process Corp.

Liquid Clarification. Apparatus therefor. No. 2,253,543. William C. Weber and William E. Geissler to Petree & Dorr Engineers, Inc.

Portable Degreasing Unit. No. 2,253,579. Willard D. Phillips and Ralph A. Van Fossen to The Dow Chemical Co.

Rectification, absorption and gas scrubbing method and apparatus. No. 2,253,925. Merle A. Zimmerman.

Heat-exchanger. No. 2,254,070. Georgre T. Jacocks to The Lummus Co.

Liquid Clarification apparatus. No. 2,254,176. Anthony J. Fischer to The Dorr Co., Inc.

Fine Chemicals

Protein Composition and method of making same. No. 2,251,334. Lloyd A. Hall to The Griffith Laboratories, Inc.

Mercaptothiazolines, process preparing 2-mercaptothiazaline by reaction of 2-chlorethylamine, an alkali and carbon disulfide. No. 2,251,459. Roger A. Mathes to The B. F. Goodrich Co.

Mono-(organic mercury)-acetylides of the formula $R\text{-}Hg\text{-}C{\equiv}CH$, in which R stands for a radical selected from the group consisting of hydrocarbon and hydrocarbon substituted by a member of the group consisting of nitro, amino, alkoxy and hydroxyl groups and halogen, 1 carbon atom of R being directly linked to the mercury atom. No. 2,251,778. Wilhelm Bonrath and Heinrich Klos to Winthrop Chemical Co., Inc.

Esters and Amides of unsaturated acids. No. 2,251,946. William A. Lott to E. R. Squibb & Sons.

Anesthetic Base, process of producing. No. 2,251,996. Samuel D. Goldberg to Novocol Chemical Mfg. Co., Inc.

Diethylstilbestrol and other stilbene derivatives, and intermediated therefor. No. 2,252,696. William Braker, Morris A. Dolliver, Edward Pribyl and Franklin A. Smith to E. R. Squibb & Sons.

Mercuri Alkyl Phenol derivatives. No. 2,252,705. Walter G. Christiansen to E. R. Squibb & Sons.

Haloalkyl Polyacyl Glycosides. No. 2,252,706. Harold W. Coles and Mary L. Dodds to E. R. Squibb & Sons.

Erythramine and process for its production. No. 2,252,709. Karl Folkers and Frank Koniuszy to Merck & Co., Inc.

Anesthetic intermediate and process for manufacturing the same. No. 2,252,713. Samuel D. Goldberg and William F. Ringk to Novocol Chemical Mfg. Co., Inc.

Sorbitol Salicylic Acid. No. 2,252,725. Joseph B. Niederl.

Sulfanilamide Solution. No. 2,252,822. Clarence A. Vogenthaler to Donley-Evans & Co.

Citric Acid. Method of manufacture. No. 2,253,061. Gordon M. Cole to California Fruit Growers Exchange.

Photographic silver halide emulsion. No. 2,253,078. Wesley G. Lowe to Eastman Kodak Co.

Non-dialysable Substances capable of depressing the blood pressure and containing a thermo-stable component in particularly high concentration. No. 2,253,124. Max Hartman and Emil Schlitter to Ciba Pharmaceutical Products, Inc.

Vitamin B1. Process for preparation. No. 2,252,921. Zoltan Foldi and Arpad Gerees.

Estradiol higher fatty acid ester. No. 2,253,669. Chinoin Gyogyszer Es Vegyeszeti Termekek Gyara R. T. (Dr. Kereszty & Dr. Wolf).

Derivatives of Fluoranthene and process of making same. No. 2,253,-789. Walter Kern and Theodor Holbro and Richard Tobler to Society of Chemical Industry in Basle.

Symmetrical di-2-octyl Guanidine. No. 2,254,009. Ingenuin Hechenbleikner to American Cyanamid Co.

Organic Compounds of quinquevalent phosphorus. No. 2,254,124. Philip G. Stevens and Howard S. Turner to E. I. du Pont de Nemours & Co.

P-azidobenzene compounds. No. 2,254,191. Richard O. Roblin, Jr. to American Cyanamid Co.

Process for the manufacture of organosoluble cellulose alkyl ethers. No. 2,254,249. Richard W. Swinehart and Albert T. Maasbert to The Dow Chemical Co.

1-amino-4-arylaminoanthraquinone which carries in the 2-position a substituent of the group consisting of H, $—SO_3H$ and $—SO_3M$ in which M stands for an alkali metal and in which the arylamino group is a heterocyclic radical of the class consisting of aminobenzodioxans and aminobenzodioxoles. No. 2,254,230. Herbert A. Lubs and Oliver H. Johnson to E. I. du Pont de Nemours & Co.

Ketones. Process which comprises subjecting a carboxylic acid of the general formula RCOOH wherein R stands for an unsaturated cyclopentanopolyhydrophenanthrene radical having in 3-position an acyl-oxy radical to the decomposing method known as Curtius reaction, saponifying the acyl-oxy radical in the amine thus obtained, oxidizing the hydroxyl group by the action of chromic acid. No. 2,254,562. Max Bochmuhl, Gustav Ehrhart and Heinrich Ruschig to Winthrop Chemical Co.

Therapeutically effective substituted 4,4′ diaminodiphenyl sulfones. No. 2,254,872. Morris S. Kharasch and Otto Reinmuth to Eli Lilly & Co.

5-Substituted imino-1, 3-dioxanes. No. 2,254,876. Murray Senkus to Commercial Solvents Corp.

Process Producing a 2-(p-nicotinylaminobenzenesulfonamido) Pyridine which comprises treating nicotinyl chloride hydrochloride with aniline to form nicotinylaminobenzenehydrochloride, converting the nicotinylaminobenzenehydrochloride into nicotinylaminobenzenesulfate, subjecting the resulting product to the action of chlorosulfonic acid to form p-nicotinylaminobenzenesulfonylchloride sulfate, and treating the resulting p-nicotinylaminobenzenesulfonylchloride sulfate with alpha-aminopyridine. No. 2,254,877. Elmer H. Stuart to Eli Lilly & Co.

Industrial Chemicals

Tetrahydrofuranes. Production from 1.4-butylene-glycols. No. 2,251,-292. Walter Reppe to General Aniline & Film Corp.

Bromine Recovery. Process of extracting bromine from Salt Lake brine. No. 2,251,353. William A. Gale and Edward P. Pearson to American Potash & Chemical Corp.

Prevention of Emulsions. Process for preventing water-in-oil type emulsions resulting from acidization of calcareous oil-bearing strata. No. 2,251,393. Charles M. Blair, Jr. to Petrolite Corp., Ltd.

Starch making process. No. 2,251,448. Fred O. Giesecke to Corn Products Refining Co.

Alkali Metal Silicate solutions and manufacture thereof. No. 2,251,-515. Daniel B. Curll, Jr. to Philadelphia Quartz Co.

Detergent. Method manufacturing detergent, wetting-out and emulsifying agent, consists in mixing phenols with monohydric higher alkyl alcohols having more than 6 atoms of carbon, heating the mixture with the addition of an ammonium salt as a catalyser so as to combine the phenols with the monohydric higher alkyl alcohol and causing the thus-obtained product to react with a sulfonation agent, maintaining it at a temperature below 25°C., and thus converting the same into a sulfonated compound. No. 2,251,536. Eitaro Watanabe and Shugi Kawamura to Miyoshi Kagakukogyo Kabushiki Kaisha.

Mono Ester of glycol with anacardic acid. No. 2,251,547. Emil E. Novotny and George K. Vogelsang to Durite Plastics Inc.

Conversion of Hydrocarbons. In production of hydrocarbons containing more than one carbon atom in the molecule by conversion of carbon monoxide with hydrogen in the presence of a catalyst, step of reacting a gas mixture containing at the most about two parts of hydrogen to one part of carbon monoxide and alternately at intervals, a gas mixture richer in hydrogen containing at least 2.5 parts of hydrogen to one part of carbon monoxide, thereby reactivating the catalyst. No. 2,251,554. Franz Sabel, Hans Laudenklos, Wilhelm Wenzel and Fritz Keilig to Standard Catalytic Co.

Dry Cleaning Solvent in which has been incorporated from about .025% to about 6% of a polyglycerol partially esterfied with a mixture of fatty acids containing in predominant proportion saturated fatty acids having from 8 to 22 carbon atoms. No. 2,251,-691. Albert S. Richardson to The Procter & Gamble Co.

Esterifying Glycerol with a fatty acid having eight or more carbon atoms per molecule to form a product rich in fatty acid monoglyceride comprises mixing one molar proportion of said fatty acid with at least one molar proportion of glycerol in the presence of boiling dioxane and in esterification catalyst. No. 2,251,692. Albert S. Richardson to The Procter & Gamble Co.

Reacting Triglyceride fats and oils with glycerol to form a product rich in monoglyceride comprising boiling a mixture of one molar proportion of said fat or oil, at least two molar proportions of glycerol, dioxane, and a glyceroxide catalyst. No. 2,251,693. Albert S. Richardson & Eddy W. Eckey to The Procter & Gamble Co.

Dry Cleaning Solvent in which has been incorporated from about .025% to about 6% of an ester derived from a water-soluble aliphatic hydroxy carboxylic acid and an aliphatic hydroxy carboxylic acid and an aliphatic carboxylic acid having from 8 to 22 atoms of carbon said ester being 'balanced' in that the ration of the total number of free hydroxyl and carboxyl groups in the hydroxy acid portion of the ester to the number of esterified hydroxyl groups is at least one. No. 2,251,694. Nathaniel B. Tucker to The Procter & Gamble Co.

Fatty Acid Esters of aliphatic hydroxy compounds. No. 2,251,695. Nathaniel B. Tucker to The Procter & Gamble Co.

Ortho-phenoxy-benzoic Acid, method of converting ortho-phenoxy-phenyl-benzoate to ortho-phenoxy-benzoic with water in the presence of a small amount of a hydrolytic agent compared with the amount of ortho-phenoxy-phenyl-benzoate present in the conversion zone. No. 2,251,743. William A. Knapp to General Chemical Co.

Aqueous Fluid Treatment with material comprising approximately 70% finely divided coal approximately 20% sodium aluminum tannate, approximately 5% ammonium ferrous sulfate and approximately 5% magnesium tannate. No. 2,251,748. Rowland R. Magill to Hubert E. Howard.

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Esters of maleic acid and unsaturated alcohols. No. 2,251,765. Ben E. Sorenson to E. I. du Pont de Nemours & Co.
Wetting and Detergent Composition comprising one part by weight of an ester of sulfosuccinic acid with an aliphatic alcohol of 5 to 10 carbon atoms, together with from 1 to 3 parts by weight of urea as a solubilizing agent therefor. No. 2,251,768. Robert C. Swain to American Cyanamid Co.
Salts of oxidized petroleum acids. No. 2,251,819. Robert E. Burk and Everett C. Hughes to The Standard Oil Co.
Tetrahydrofurane, production from 1, 4 butylene glycol. No. 2,251,-835. Walter Reppe and Hans-Georg Trieschmann to General Aniline & Film Corp.
Tetrahydrofuranes, in the production thereof from 1.4-butylene glycols the step which consists in heating a liquid 1.4-butyleneglycol in the presence of aluminum oxide at a temperature at which a mixture of tetrahydrofurane and water distils off. No. 2,251,895. Walter Reppe, Otto Hecht and Adolf Steinhofer to General Aniline & Film Corp.
N-Nitroaryl Tetrahydroquinoline compounds wherein aryl represents a member selected from the group consisting of a benzene nucleus and a naphthalene nucleus. No. 2,251,922. Joseph B. Dickey and James B. Normington to Eastman Kodak Co.
Carboxylic Acid Esters of unsaturated alcohols, process of making same. No. 2,251,983. Henry C. Chitwood to Carbide & Carbon Chemicals Corp.
Sulfonium Compounds, process for preparation comprising bringing an alkyl thioether and an alkyl chloride into contact in an anhydrous alcohol for a time sufficient to form a tri-alkyl sulfonium chloride, adding a solution of an alkali in an anhydrous alcohol to the resulting reaction mixture and hydrolyzing the said sulfonium chloride to form a tri-alkyl sulfonium hydroxide. No. 2,252,081. Eugene Lieber to Standard Oil Development Co.
Breaking Water-in-oil Emulsions. Method of breaking same comprises subjecting emulsion to action of a demulsifying agent comprising a sulfonic body derived from a non-paraffinic extract of a petroleum oil boiling within lubricating oil range. No. 2,252,110. Bradshaw F. Armendt to Standard Oil Development Co.
Benzoic Acid. Method separating small amounts of phthalic acid impurities from benzoic acid. No. 2,252,117. Courtney Conover to Monsanto Chemical Co.
Alkyl Thioethers. Process of manufacturing same without formation of mercaptans of polysulfides. No. 2,252,138. John T. Rutherford to Standard Oil Co. of Calif.
Vaporizing Hydrocarbon Liquid Gas. No. 2,252,261. Sam P. Jones.
Manufacture of Sulfur Dioxide and Portland Cement from mixture of calcium sulfate and the usual additions containing aluminum silicate. No. 2,252,279. Hans Zirngibl and Heinrich Z. Strassen to Walther H. Duisberg.
Water-Insoluble Phosphates. Process of decomposing same with nitric acid. No. 2,252,280 and 2,252,281. Otto Balz and Heinrich Hamacher to Walter H. Duisberg.
Hydrated Ferric Sulfate. Process of making. No. 2,252,332. James K. Plummer to Tennessee Corp.
Synthetic Drying Oil. Process for making. No. 2,252,333. Henry S. Rothrock to E. I. du Pont de Nemours & Co.
Condensation Product containing sulfur. No. 2,252,366. Walter Frost, Kreis Schweidnitz to Silesia Varein Chemischer Fabriken.
Complex Esters and processes of producing them. No. 2,252,393. Theodore F. Bradley & William B. Johnston to American Cyanamid & Chemical Co .
Guanidine Nitrate. Method for manufacture. No. 2,252,400. William H. Hill and Robert C. Swain to American Cyanamid Co.
Amine Derivatives of aliphatic sulfodicarboxylic acids. No. 2,252,401. Alphons O. Jaeger to American Cyanamid & Chemical Corp.
Water Soluble Esters of polymeric metaphosphoric acids. No. 2,252,-479. Anneliese Beyer to Chemische Fabrik Joh. A. Benckiser.
Fluorescent Silicate. Method of preparation. No. 2,252,500. Gorton R. Fonda to General Electric Co.
Pyrolysis of chlorinated hydrocarbons. No. 2,252,536. Ralph M. Wiley to The Dow Chemical Co.
Stearates and Palmitates. Method of preparing zirconium, titanium and cerium salts of stearic acid and palmatic acid substantially free from the acid. No. 2,252,658. Maurice H. Bigelow to Plaskon Co. Inc.
Metal Salt of an alkyl-substituted hydroxy-aromatic carboxylic acid in which the alkyl substituent contains at least twenty carbon atoms and is attached to the aryl nucleus. No. 2,252,662. Orland M. Reiff to Socony-Vacuum Oil Co., Inc.
Alkyl Substituted Aryl Metal Hydroxylate in which the alkyl substituent contains at least twenty carbon atoms and is attached to the aryl nucleus. No. 2,252,663. Orland M. Reiff to Socony-Vacuum Oil Co., Inc.
Alkyl-substituted Metal Aryl Hydroxylate-metal Carboxylate Salts and method of making them. No. 2,252,664. Orland M. Reiff, John J. Giammaria, and Horace E. Redman to Socony-Vacuum Oil Co., Inc.
Metal Salts of Alkyl Substituted Aryl Ether Acids and method of making them. No. 2,252,665. Orland M. Reiff and Ferdinand P. Otto to Socony-Vacuum Oil Co., Inc.
Wax-substituted Aryl Ether Acids and method of making same. No. 2,252,666. Orland M. Reiff and Ferdinand P. Otto to Socony-Vacuum Oil Co., Inc.
Secondary Xenoxy-alkyl-amines. No. 2,252,828. Francis N. Alquist and Harold R. Slagh to The Dow Chemical Company.
Aromatic Hydrocarbons. Method of making. No. 2,252,842. Harold Fehrer to Process Management Company Inc.
Quaternary Ammonium Salts. No. 2,252,863. Albert L. Raymond and Robert T. Dillon to G. D. Searle & Co.
Alkali Metal Sulfide and Hydrosulfide. Process for production and concentration. No. 2,252,867. James S. Sconce and Charles F. Berlinghoff to Hooker Electrochemical Company.
Petroleum Sulfonates. Process for production. No. 2,252,957. John R. Averill and Edwin E. Claytor to Petrolite Corporation, Ltd.
Acetaldehyde. Process for producing comprises reacting acetylene with steam in the presence of a calcined mixture of a phosphoric acid and a siliceous material capable of forming a silico-phosphoric acid complex. No. 2,253,034. Vladimir N. Ipatieff and Raymond E. Schaad to Universal Oil Products Co.
Anarcardic Acid. Method producing nitrogen containing derivative of anacardic acid. No. 2,253,088. Emil E. Novotny and George K. Vogelsang to Durite Plastics, Inc.
Alpha-Beta Unsaturated Acids. Compounds of group 1V-B elements with alpha-beta unsaturated acids. No. 2,253,128. Carl M. Langkammerer to E. I. du Pont de Nemours & Co.
Hydroaromatic Amide. No. 2,253,179. Winfrid Hentrich, Carl A. Lainau, deceased, by Adolf Bartholomaus and Wilhelm J. Kaiser to The Procter & Gamble Co.
Carbon Monoxide Detection Method and testing gas therefor. No. 2,253,187. Adolph Z. Mample to The Western Union Telegraph Co.
Drying Oils. Production of same from unsaturated hydrocarbons. No. 2,253,323. Friedrich Christmann to General Aniline & Film Corp.
Mono-ethers of unsaturated dihydric alcohols and method for producing the same. No. 2,253,342. Louis A. Mikeska and Erving Arundale to Standard Oil Development Co.
Chlorination of titanium bearing materials. No. 2,253,470-471. Irving E. Muskat and Robert H. Taylor to Pittsburgh Plate Glass Co.
Refining Vegetable Oil containing free fatty acids, the method which comprises treating the oil with sodium ferrocyanaide, to decrease the acidity, then treating the oil with an alkali to neutralize additional acid and form soap, and separating the soap from the remaining oil. No. 2,253,480. Raymond E. Daly and James F. Walsh to American Maize-Products Co.
Liquid Electrolyte composition suitable for use in capacitors. No. 2,253,506. Frank M. Clark to General Electric Co.
Soya Bean Protein Composition. Method of preparing. No. 2,253,-517. Albert J. Heberer to The Glidden Co.
Ethyl Acetate. Preparation of same comprises effecting the reaction between acetic acid and ethylene in the presence of a boron trifluoride dihydrate catalyst. No. 2,253,525. Donald J. Loder to E. I. du Pont de Nemours & Co.
Mono-alkyl Derivatives of Urea. Process of producing. No. 2,253,-528. John F. Olin to Sharples Chemicals Inc.
Extraction of Sulfur from an ore comprising a mixture of sulfur with gangue material that is solid at the melting point of sulfur. No. 2,253,566. Ernest Klepetko.
Acidic Liquor Purification. Process for removing color-imparting ions from residual sulfuric acid solution obtained from hydrolysis of a titanium salt solution. No. 2,253,590. Roy W. Sullivan to E. I. du Pont de Nemours & Co.
Ester Condensation products which comprises heating to reaction temperatures a mixture containing fumaric acid, a conjugated terpene of the $C_{10}H_{16}$ series and a reactive solubilizing alcohol. No. 2,253,681. Theodore F. Bradley and William B. Johnston to American Cyanamid Co.
Liquid Treating composition and method of making same. No. 2,253,-722. Bruno Montero to Investo Co., Inc.
Ethers of triethylene glycol. No. 2,253,723. Leonard P. Moore to American Cyanamid Co.
Ethyl Alcohol. Process of removing water therefrom. No. 2,253,755. Gilbert W. Brant to E. I. du Pont de Nemours & Co.
Polymerization Products containing sulfur dioxide and process for producing same. No. 2,253,775. Frederick E. Frey, Robert D. Snow and Louis H. Fitch, Jr. to Phillips Petroleum Co.
Substituted Hydroxyaromatic Acids. No. 2,253,811. Orland M. Reiff to Socony-Vacuum Oil Co., Inc.
Hydrogenation Catalysts. Process for reactivation. No. 2,253,835. Victor E. Wellman to The B. F. Goodrich Company.
Metal Hydrogenation Catalyst. Method of activating. No. 2,253,871. Waldo L. Semon to The B. F. Goodrich Co.
Carbon Dioxide Blocks. Method of making. No. 2,253,880. William E. Zieber to York Ice Machinery Corp.
Polymerizable Hydrocarbons. Method of manufacture. No. 2,253,934. Morton Harris to Monsanto Chemical Co.
Formaldehyde Solutions. Method for stabilizing the acidity thereof. No. 2,253,999. Philip I. Bowman and John Burton to Heyden Chemical Corp.
Chlorine and Sodium Sulfate. Process for making. No. 2,254,014. Napoleon A. Laury to American Cyanamid Co.
Soap Stock and process of making. No. 2,254,074. Hermann Klaue to Argus Motoren Gesellschaft m. b. H.
Animal and Vegetable Oils. Method of refining. No. 2,254,101. Benjamin Clayton to Refining, Inc.
Glycerides. Process of hydroalyzing. No. 2,254,109. Edward A. Nill to The H. A. Montgomery Co.
Urea and thiourea derivatives. No. 2,254,136. Johannes S. Buck and Edwin J. de Beer.
Catalyst and process for producing vinyl acetate and ethylidene diacetate. No. 2,254,212. Joseph G. Dinwiddie to E. I. du Pont de Nemours & Co.
In Viscose Coagulating Bath circulatory system in which spent bath liquor is removed from the coagulating vat, part of the water thereof evaporated, new acid supplied and the reconditioned liquor returned to the coagulating vat, the step which comprises adding the fresh sulfuric acid to the bath liquor while the water is being evaporated to recondition said bath liquor. No. 2,254,237. Roy W. Nash to E. I. du Pont de Nemours & Co.
Process of Reinforcing and Solidifying Porous masses of earth, rock, masonry, concrete and the like, which comprises combining hydraulic cement, water, a finely divided material containing acidic colloidal silica and a suspension stabilizing agent, thoroughly mixing the combined ingredients to obtain a stable, homogenous suspension, and forcing the suspension into the voids and interstices of the mass while the suspension is plastic and before stiffening the suspension due to gellation of the cement takes place. No. 2,254,-252. Louis S. Wertz.
Manufacture of a Secondary Aliphatic Nitrate which comprises reacting a mixture of nitric and sulfuric acids with a compound selected from the group consisting of secondary aliphatic alcohols and olefins of the type RCH═CHR′ wherein R is an aliphatic radical and R′ is a member selected from the group consisting of hydrogen and an aliphatic radical, at a temperature not substantially above 10°C. No. 2,254,352. Gould H. Cloud and William J. Sparks to Standard Oil Development Co.
Polymerizable Mono-ester of maleic acid and polymers derived therefrom. No. 2,254,382. Harry T. Heher to Rohm and Haas.
System for the manufacture of sugar. No. 2,254,386. Charles A. Olcott.
Means for Conditioning Sugar bearing materials. No. 2,254,387. Charles A. Olcott.
Means for Preventing Dilution of sugar bearing materials. No. 2,254,-389. Charles A. Olcott.

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Temperature Conditioning of sugar bearing material. No. 2,254,390. Charles A. Olcott.

Agent for Stabilizing and controlling the flow of oxygen from oxygen-containing per-compounds, the combination comprising water-soluble salts of amino acetic acid having at least two carboxyl groups in the alpha positions for each basic nitrogen atom present and magnesium silicate said water-soluble salts being present in excess of the quantity of said magnesium silicate. No. 2,254,434. Otto Lind and Herbert Colonius to The Procter & Gamble Co.

Non-flammable Solvent. In admixture with a flammable solvent comprising a lower aliphatic alcohol adapted for use in moistening master copies in direct process duplication, from 3% to 35% of mono-fluoro tri-chloro methane as a flammability reducing agent. No. 2,254,469. Johan Bjorksten to Ditto, Inc.

Method Removing Foreign Matter such as greasy substances, superficial carbon, wax and soaps from a metal article comprising heating the article for a predetermined period by immersion in a bath of oil for a sufficient time to raise the surface of the article to a temperature materially above the boiling point of water and immediately thereafter quenching the article by dipping the article in an aqueous alkaline detergent bath heated to about the boiling point of said bath. No. 2,254,492. Gilbert H. Orozco to Gilron Product Co.

Emulsifying Clarifyer Vitalizer. No. 2,254,565. Peter J. Chappelle.

Carbon Black. Process for production. No. 2,254,572. Frederick J. Harlow to Phillips Petroleum Co.

Acetic Acid. In process of oxidizing acetaldehyde to acetic acid by contacting an oxygen-containing gas with an acetic acid solution of acetaldehyde, the improvement which comprises controlling the introduction of acetaldehyde to the reaction zone and the withdrawal of acetic acid solution of acetaldehyde therefrom so as to maintain the concentration of acetaldehyde in the reacting liquor at not exceeding 15% by weight and so as to maintain the acetaldehyde concentration in the effluent acetic acid solution at not less than 5% by weight. No. 2,254,725. Dwight C. Bardwell to The Solvay Process Company.

In Process of Recovering Phenols from their aqueous solutions by adsorption with active carbon the improvement which comprises used as the adsorbent non-coking mineral, coal which has been activated with steam. No. 2,254,745. Joseph Jannek to William Ellyson Currie.

Conversion of Carbon Monoxide and Hydrogen into hydrocarbons containing more than one carbon atom in the molecule. No. 2,254,748. Wilhelm Michael and Wolfgang Jaeckh to William E. Currie.

Process of Refining Crude Oleoresin. No. 2,254,785. Wiley C. Smith, Jesse O. Reed, Fletcher P. Veitch and George P. Shingler to Henry A. Wallace, Sec. of Agric. of U. S. and his successor.

Acid Recovery Process. In process removing organic impurities from sulfuric acid which has been contacted with olefinic hydrocarbon, the step comprising intimately contacting an excess of hydrogen chloride with said acid at a temperature between the freezing point of said acid and about 50°C. for a period of time not exceeding about 20 minutes, under which conditions at least a part of said impurities is rendered insoluble in said acid, said insoluble impurities consisting of a fluid phase comprising essentially organic halides. No. 2,254,788. Seaver A. Ballard to Shell Development Co.

Removal of Carbon Monoxide from mixtures thereof with hydrogen. No. 2,254,799. Donrad Erdmann to American Magnesium Metals Corp.

Conversion of Carbon Monoxide with hydrogen to produce hydrocarbons containing more than one carbon atom in the molecule which comprises operating in the presence, as catalyst, of sintered iron to which an alkali metal compound which in aqueous solution has a neutral or acid reaction, has been added. No. 2,254,806. Wilhelm Michael to William E. Currie.

Continuous Treatment of exhausted solvent-impregnated solid agglutinative organic materials consisting in continuously feeding within a container a stream of such solvent-impregnated material, centrifugating the particles composing said stream, subjecting such material during such centrifugation to the solvent entraining action of a current of steam passed through said container, continuously discharging such material from the container, condensing the steam and entrained solvent, and separating the solvent from the condensed steam. No. 2,254,867. Michele Bonotto to Extractol Process Ltd.

Luminescent Substance highly responsive to radiation having a wave length of 2537 Angstrom units and highly emissive in the range of approximately 3000 to 4800 Angstrom units, such substance being a silicate of a metal of the group consisting of aluminum, beryllium and magnesium, activated by an addition of up to 30% by weight of cerium sesquioxide. No. 2,254,956. Gunther Aschermann to General Electric Co.

Soap. Method and apparatus for making. No. 2,254,996. Benjamin Clayton to Refining, Inc.

Leather

Artificial and Synthetic Leathers. Process for regeneration of waste products. No. 2,253,991. Nikita Strachovsky to Société Salpa Française.

Tanning Hides and Skins. Composition for use in the fat liquoring of tanned hides and skins comprising an oil, an emulsifying agent therefor, and a minor amount of an additive lower aliphatic polyhydric alcohol ether of an unsaturated cyclic terpene compound. No. 2,254,713. William W. Stapler to Hercules Powder Co.

Metals, Alloys

Magnesium Alloy. No. 2,251,266. Arthur Burkhardt, Richard Knabe and Karl Riederer to George Von Giesche's Erben.

Annealing Steel. Method annealing relatively high alloy steels containing upwards of about one and one-half percent of transformation retarding alloying elements other than carbon, which comprises: heating the steel to about 10° to 350°F. above its critical temperature rapidly cooling the steel to the temperature range of about 10° to 150°F. below the critical and above a temperature of 1050°F., holding within said range until the austenite formed above the critical has been substantially converted into a relatively soft mixture of ferrite and carbides having a room temperature hardness of about 30 Rockwell "C" and under, and thereupon rapidly cooling said steel substantially to room temperature. No. 2,251,290. Warren B. Reed.

Alloy. Constant coefficient mechanical vibratory element containing 45.8% Fe, 34.8% Ni, 15.7% Mo, 2.2% Mn, 1.2% Co, 0.3% C. No. 2,251,356. James E. Harris to Bell Telephone Laboratories, Inc.

Magnesium Vapor, method of condensing. No. 2,251,906. Joseph D. Hanawalt to The Dow Chemical Co.

Magnesium production by cyclic process which results in very pure magnesium from magnesium ores. No. 2,251,968. Carlo Adamoli to Perosa Corp.

Non-corrosive Alloy of lead, comprising substantially 4.75%-6.00% of tin substantially 4.50%-5.75% antimony, substantially 0.25%-1.75% copper, substantially 0.05%-0.25% arsenic and the remainder lead. No. 2,252,104. Albert H. Walde.

Solders. No. 2,252,409 to 2,252,414. August H. Reismeyer to Aluminum Co. of America.

Aluminum conductor metal. No. 2,252,421. Philip T. Stroup to Aluminum Co. of America.

Hardening Copper which consists in mixing with four pounds of copper in a molten state, one ounce of copper phosphorus, one-half ounce of salicylic acid and one-half ounce of powdered pumice. No. 2,252,604. Jonathan W. Sturtz.

Metal Products. Method of forming. No. 2,252,697. Herman A. Brassert to Minerals and Metals Corp.

Metal Powder. Process and apparatus for making. No. 2,252,714. Everett J. Hall, deceased by Harriet L. Hall to Metals Disintegrating Co., Inc.

Granulated or Fibrous Lead. Method of producing. No. 2,252,876. Watson H. Woodford to Remington Arms Company, Inc.

Nickel-Bearing Alloys. Process for treating. No. 2,253,334. Philip R. Kalischer to Westinghouse Electric & Manufacturing Co.

Thermit Ignition. Process therefor. No. 2,253,364. Frederick W. Cohen to Metal & Thermit Corp.

Tool Steel. No. 2,253,385. William E. Mahin to Westinghouse Electric & Manufacturing Co.

Deoxidizing and degasifying liquid steel. Method and apparatus therefor. No. 2,253,421. Baltzar E. L. de Mare.

Non-ferrous Cobalt alloy. No. 2,253,476. Roy T. Wirth.

Malleable Iron. No. 2,253,502. Alfred L. Boegehold to General Motors Corp.

Deoxidation of Steel. Process of controlling. No. 2,253,574. Carl F. Norbeck to Bethlehem Steel Co.

Finely Divided Lead. Process for producing. No. 2,253,632. Yurii E. Lebedeff to American Smelting & Refining Co.

Carbon Molybdenum welding rod. No. 2,253,812. Robert M. Rooke and Frederick C. Staacke to Air Reduction Co., Inc.

Clean-up Agents for thermionic valves, composed of comminuted active getter alloy of barium and magnesium and from 7% to 15% by weight of at least one comminuted refractory oxide selected from the group consisting of alumina, silica, and magnesia which under flashing conditions is substantially inert and non-volatile. No. 2,253,862. John D. McQuade to Kemet Laboratories Company, Inc.

Electrolytic process for depositing tin without the necessity of interruption of the operation. No. 2,253,865. Daniel Lattimer and Max F. W. Heberlei to The American Metal Company, Ltd.

Chromium-Molybdenum-Carbon Alloy. No. 2,253,873. Jacob Trantin, Jr.

Hard Metal Alloy for structures operating under pressure and/or sliding motion. No. 2,253,969. Walther Dawihi and Adolf Fehse to General Electric Company.

Lead Bearing Steel. Method of casting. No. 2,254,156. Wilbur A. Saylor and Laurin D. Woodworth.

Nickel. Process recovering from ores containing same. No. 2,254,158. Kenneth M. Simpson.

Electroplating. Process of electrodepositing nickel from a plating solution containing a compound thereof in association with an addition agent comprising an alkali metal salt of a sulfuric derivative of at least one of the following alcohols myristic, cetyl, stearic. No. 2,254,161. Virgil H. Waite and Bernard P. Martin to The McGean Chemical Co.

Radioactive Metals and Alloys. No. 2,254,170-171. John H. Dillon to The Firestone Tire and Rubber Co.

Casting Alloy composed of the elements in the relative quantities by weight within the ranges set out below copper 4.5-6.0%, Nickel .5-2.0%, Magnesium .1 to .25%, Titanium .1 to .25%, Chromium .25 to .5%, Aluminum the remainder. Traces of impurities and other elements. No. 2,254,202. George E. Barnes.

Method of Case Hardening ferrous metal parts which comprises immersing the parts in a molten salt bath containing an alkali metal cyanide while protecting said bath from atmosphere by a covering layer of graphite and decomposing the cyanide by reaction with an alkali metal salt of an oxygen compound of phosphorus, the remainder of said bath being essentially made up of alkali metal salts. No. 2,254,296. Paul H. Kramer to Park Chemical Co.

Neutral Salt Heat Treating Bath for treating steel at temperatures between 1300°F. and 1700°F., said bath containing a salt from a group consisting of alkaline and alkaline earth chlorides and a small quantity of silicon. No. 2,254,328. Francis J. Steigerwald to Park Chemical Co.

Sintered Metal Composition. No. 2,254,549. Louis Small.

Hot Pressed or Extruded Alloy of about 50% to about 75% zinc, 2% to about 15% copper, and balance substantially pure manganese, the manganese being present in proportions at least equal to that of copper. No. 2,254,598. Reginald S. Dean to Chicago Development Co.

Manufacture of Sulfur Poor Iron comprising charging a mixture of iron bearing ores, coke and fluxes in an air blast furnace, superheating steam outside the furnace to a temperature of 400 to 800°C. under avoidance of dissociation, introducing the undissociated steam exclusively into a zone of the furnace having approximately the temperature of the introduced steam, reducing a part of the steam after its introduction into the furnace by the action with the upwardly flowing carbon monoxide to hydrogen and converting the sulfur present in the charge by reaction with said hydrogen and with the undecomposed steam into gaseous sulfur compounds. No. 2,254,660. Karl Koller and Zsigmond Galocsy.

Separating Components of Metal Mixtures comprising heating the mixture up to temperature below the solidus point but within the temperature range of high brittleness of the lowest melting metal, subjecting the mixture to mechanical stress to reduce the lowest melting metal to powder and separating the powder from the remainder of the mixture. No. 2,254,805. Erich Junker and Willibald Leitgebel.

Metal Melting Furnace. No. 2,254,809. Filip Tharaldsen.

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Material for Pen Tips which comprises a hard corrosion resistant material consisting predominantly of platinum carbide and containing a relatively soft metal. No. 2,254,975. Milton R. Pickus to The Parker Pen Co.

In **Manufacture of Iron and Steel** method of decreasing the oxygen content, increasing the nitrogen content and improving the physical properties of the metal which includes the step of bringing into nitrogen-liberating contact with the molten metal between about ½ pound and 8 pounds per ton of metal of calcium cyanamid. No. 2,255,016. Earle C. Smith and George T. Motok to Republic Steel Corp.

Paints and Pigments

Driers for varnishes, lacquers, oil colors and plastic masses of every kind which contain drying oils, the said driers being soluble in oil and volatile solvents especially benzine. No. 2,251,798. Friedrich Meidert and Emmerich v. Pongratz and Hermann Schatz to I. G. Farbenindustrie Aktiengesellschaft.

Varnish Base process of making which consists in heating at about 200°C. a mixture containing a liquid terpene dipolymer boiling at 193-195°C. at 25 mm. and a drying oil containing conjugated double bonds. No. 2,251,802. Irving Pockel to Ellis Foster Co.

Ceramic Pigment, yellow to brown in color consisting of oxides of chromium, tungsten, and titanium in the form of a calcination product. No. 2,251,829. Carl J. Harbert to The Harshaw Chemical Company.

Zinc Chromate Pigment having formula $5ZnO.CrO_3 4H_2O$. No. 2,251,-846. Reuben W. Leisy to The New Jersey Zinc Co.

Zinc Oxide Pigments. No. 2,251,869 to 2,251,872. David L. Gamble and James H. Haslam to The New Jersey Zinc Co.

Cellulose Ether Varnishes and method of making. No. 2,252,521 and 2,252,522. Norman R. Peterson and Joseph L. Sherk to The Dow Chemical Co.

Pigment Material. Method of making, comprises calcining mixture containing sulfate of iron and cyanogen-bearing material. No. 2,253,274. Joseph C. Heckman to Potter Title and Trust Company.

Titanium Pigment production comprising heating a mixture of anatase titanium dioxide and a minor amount of zinc oxide at a temperature between about 840°C. and 1100°C. until by X-ray examination the presence of a substantial amount of rutile titanium dioxide can be detected. No. 2,253,551. James E. Booge to E. I. du Pont de Nemours & Co.

Titanium Oxide production. No. 2,253,595. Howard J. Wood to E. I. du Pont de Nemours & Co.

Pigment Material. In process for the production of improved dry pigments for use in organic media the step which comprises adding to a white pigment material between about 0.05% and about 0.8% based upon the weight of the pigment, of a member selected from the group consisting of naphthenic acid and salts thereof and thereafter milling to obtain intimate association of said naphthenate material and pigment. No. 2,254,630. Roy W. Sullivan to E. I. du Pont de Nemours & Co.

Paper and Pulp

Grease-proof Paper. In manufacture thereof step of applying to the surface a solution of polyvinyl alcohol having an intrinsic viscosity based on a 4% solution in water at 25% C., of from 10 to 100 centipoises. No. 2,251,296. Joseph H. Shipp to E. I. du Pont de Nemours & Co.

Paper treated with a composition comprising glycerol and a substance selected from the group consisting of the glyceryl stearates, glycol stearates, triethanolamine stearate and trihydroxyethylamine stearate. No. 2,253,655. Frederick Shurley to Crown Cork & Seal Co., Inc.

Petroleum

Lubricating Oil produced from petroleum oil by selective solvent extraction. No. 2,251,474. Hendrikus van der Waerden to Shell Development Co.

Lubricant having following formula: 10 to 20% of soda soaps of stearic and rosin acids, 5 to 20% of a vegetable wax having an acid number of less than 20 and 60 to 85% of a mineral lubricant oil having a Saybolt viscosity at 210°F. greater than 60 seconds. No. 2,251,528. Lorne W. Sproule and Edmund J. Higgins to Standard Oil Development Co.

Lubricant. Improved composition comprising waxy lubricating oil and a small amount of a pour depressing compound, prepared by subjecting a mono basic fatty acid chloride to action of heat, whereby hydrogen halide is evolved and the organic residue is polymerized and continuing the heating until substantially all of the halide has been removed. No. 2,251,550. Eugene Lieber to Standard Oil Development Co.

Catalytic Cracking. Process cracking normally liquid hydrocarbons and recovering hydrocarbon mixture of gasoline boiling range. No. 2,251,571. Frank A. Howard to Standard Oil Development Co.

Converting Olefinic Hydrocarbons to hydrocarbons of higher boiling points by the polymerization thereof comprising contacting said olefinic hydrocarbons at elevated temperatures with a catalyst comprising as an active ingredient an adsorption complex of phosphoric acid on hydrous stannic oxide. No. 2,251,580. Robert F. Ruthruff to Chempats, Inc.

Lubricant comprising an oil of lubricating viscosity and a small amount of the product of reacting carbon disulfide with an amine and reacting the product thereof with sulfur to the combining of at least three atoms of total sulfur. No. 2,251,686. John M. Musselman and Herman P. Lankelma to The Standard Oil Co.

Lubricating Oil including a major proportion of a lubricant base and a minor proportion of a chloro phthalic acid. No. 2,251,738. Bert H. Lincoln and Alfred Henriksen to The Lubri-Zol Development Corp.

Solvent Refining of mineral oils by extracting with compounds selected from group consisting of morpholine and its derivatives. No. 2,251,773. Meyer S. Agruss and Wesley H. Sowers to The Pure Oil Co.

Lubricant Additive to reduce pour test of relatively high pour test lubricating oils. No. 2,251,774. Meyer S. Agruss and George W. Ayers, Jr. to The Pure Oil Co.

Lubricant stabilized by phosphorus-containing product resulting from reaction of PCl_3 with compound of class consisting of lactic acid, esters of lactic acid and salts of lactic acid. No. 2,251,953. Carl F. Prutton, Albert K. Smith and Delton R. Frey to The Lubri-Zol Corp.

Petroleum fractionation. No. 2,252,020. William Mendius to Sinclair Refining Co.

Drilling Fluids, apparatus for circulating same in drilling fluid circulation system. No. 2,252,050. Nelson W. Thompson to Shell Development Co.

Heating Oils of increased stability. No. 2,252,082. George A. Lloyd, Jr. and Eugene C. Hermann to Standard Oil Development Co.

Lubricant comprising a mineral lubricating oil, a soluble soap of a polyvalent metal and the acids produced by the air oxidation of petroleum oils and waxes, and which is substantially free of oxy organic impurities of the class consisting of esters, lactones, lactides and free acids of the type used in the preparation of the said soap and 0.25% to 1.5% of a free saturated fatty acid selected from the class of stearic and margaric acids. No. 2,252,087. John G. McNab and Walter T. Watkins to Standard Oil Development Co.

Motor Fuel comprising a hydrocarbon fuel base adapted for spark-ignition engines blended with a substantial anti-knock improving amount of an N-alkylated aromatic amine. No. 2,252,089. Pharis Miller to Standard Oil Development Co.

Aromatic Nitrogen Compounds adapted to be used as anti-knock blending agents for motor fuels. No. 2,252,099. Raphael Rosen to Standard Oil Development Co.

Asphalts, method of manufacturing from a charging stock containing asphaltenes, oily constituents and asphaltic resins. No. 2,252,111. Augustus H. Batchelder to Standard Oil Company of Calif.

Metal Fabricating Oil comprising a mildly sulfurized mineral lubricating oil containing not more than 2% of added sulfur in a soluble, corrosive form and an oil-soluble ester of an acid of phosphorus, the compound being clean and transparent. No. 2,252,133. Arnold J. Morway and John C. Zimmer to Standard Oil Development Co.

Plugging Formation in Wells by introducing into well a liquid composition consisting of mixture of an ester and an alcohol and controlling the time of set of the liquid by addition of a benzoyl peroxide catalyst. No. 2,252,271. Clyde H. Mathis to Phillips Petroleum Co.

Lubricating Composition. No. 2,252,674. Carl F. Prutton to The Lubri-Zol Corp.

Lubricating Composition. No. 2,252,675. Carl F. Prutton, Albert K. Smith and Delton R. Frey to The Lubri-Zol Corp.

Low-boiling Hydrocarbons. Method of production. No. 2,252,729. Thomas B. Prickett and George S. Dunham to Houdry Process Corp.

Catalytic Cracking of hydrocarbon oils at elevated temperatures. No. 2,252,740. John W. Teter to Sinclair Refining Co.

Lubricant comprising a petroleum lubricating oil, about 0.5-2.5% of basic calcium phenyl stearate, about 0.5-3.0% of a solubilizer and about 0.5-1.0% of a thiomid. No. 2,252,793. Franklin M. Watkins to Sinclair Refining Co.

Hydrocarbon Separation. Continuous process for separating a high molecular hydrocarbon oil into portions having different properties. No. 2,252,864. Albert Schaafsma to Shell Development Co.

High Anti-knock motor fuel from low anti-knock gasoline. No. 2,252,-927. Llewellyn Heard and Alex G. Oblad to Standard Oil Company (Corp. of Indiana).

Hydrocarbon Conversion to produce high anti-knock fuel from low anti-knock fuel. No. 2,252,928. Robert F. Marschner to Standard Oil Co. (corp. of Indiana).

Treating Pipeline Oil to reduce inorganic salt content. No. 2,252,959. Charles M. Blair, Jr. to Petrolite Corporation, Ltd.

Hydrocarbon Oil subject to deterioration at elevated temperature and a polyvalent metal salt of a sulfur containing substituted acid of phosphorus having an organic substituent therein, said salt being present in an amount sufficient substantially to inhibit said deterioration. No. 2,252,984. John T. Rutherford and Robert J. Miller to Standard Oil Company of California (a corp. of Delaware).

Hydrocarbon Oil subject to deterioration at elevated temperature, and an alkaline earth metal salt of a sulfur-containing substituted acid of phosphorus having an organic substituent therein, said salt being present in an amount sufficient substantially to inhibit said deterioration. No. 2,252,985. John T. Rutherford and Robert J. Miller to Standard Oil Company of California (a corp. of Delaware).

Hydrocarbon Oil Conversion. Cracking apparatus therefor. No. 2,253,006. Joseph G. Alther to Universal Oil Products Co.

Catalytic Conversion process for hydrocarbons. No. 2,253,007. Joseph G. Alther to Universal Oil Products Co.

Sweetening Hydrocarbon Distillates. Method therefor. No. 2,253,-011. Wayne L. Benedict to Universal Oil Products Co.

Lubricant containing oil soluble organic phosphorus compound as inhibitor. No. 2,253,227. Troy L. Cantrell and James O. Turner to Gulf Oil Corp.

Lubricant containing oil-soluble organic sulfur compound as inhibitor. No. 2,253,228. Troy L. Cantrell and James O. Turner to Gulf Oil Corp.

Cracking Oil by leached zeolites. No. 2,253,285. Gerald C. Connolly to Standard Oil Development Co.

Desulfurization of hydrocarbons. No. 2,253,308. Raphael Rosen to Standard Catalytic Co.

Solvent Treatment of petroleum oil fractions. No. 2,253,326. Garland H. B. Davis to Standard Oil Development Co.

Lubricating Oil composition. No. 2,253,399. John E. Schott and Leonard R. Churchill to Tide Water Associated Oil Co.

Catalytic conversion of hydrocarbons. No. 2,253,486. Arnold Belchetz.

Cementing Oil Wells. Apparatus therefor. No. 2,253,536 and 2,253,-537. Domer Scaramucci to Oil Equipment Engineering Corp.

Lubricant. No. 2,253,585. John E. Schott and Leonard R. Churchill to Tide Water Associated Oil Co.

High Antiknock Motor Fuel. Method of preparation. No. 2,253,607. George A. Boyd and Clarence H. Seeley to Standard Oil Co.

Motor Fuel. Method of removing acid reacting materials from a hydrocarbon oil. No. 2,253,638. Forrest L. McKennon to Pan American Refining Corp.

Hydrocarbon Conversion. Increasing rate of conversion of a heavy oil into gasoline when subjected to a suitable conversion temperature. No. 2,253,665. Vanderveer Voorhees to Standard Oil Co.

Additional patents of Petroleum, Resins, Plastics, Rubber and Textiles in the above-mentioned volumes will be digested next month.

Abstracts of Foreign Patents

Collected from Original Sources and Edited

Those making use of this summary should keep in mind the following facts:

Belgian and Canadian patents are not printed. Photostats of the former and certified typewritten copies of the latter may be obtained from the respective Patent Offices.

English *Complete Specifications Accepted* and French patents are printed, and copies may be obtained from the respective Patent Offices.

In spite of present conditions, copies of all patents reported are obtainable, and will be supplied at reasonable cost by E. L. Luaces, 1107 Broadway, New York.

This digest presents the latest available data, but reflects the usual delays in transportation and printing. We expect to begin reporting German patents in the near future. Your comments and criticisms will be appreciated.

CANADIAN PATENTS

Granted and Published February 11, 1941

Process and apparatus for reducing finely-divided oxidized ores and calcines and recovering metal therefrom. No. 394,512. American Smelting and Refining Co. (Melville F. Perkins and Roland G. Crane).

Method of recovering silver from solutions by maintaining the solution at approximately 55°C and precipitating with large bodied plane-surfaced precipitant elements. No. 394,533. Bunker Hill & Sullivan Mining & Concentrating Co. (Harold E. Lee and Barton R. Muir).

Manufacture of electrical insulating material composed of long glass fibres. No. 394,545. Fiberglas Canada Limited. (Games Slayter, Donald C. Simpson, Jesse L. Tucker and Allen L. Simison).

Method of fortifying footstuffs with minerals. No. 394,546. General Mills, Inc. (John S. Andrews, Lacey H. Evans and Louis J. Huber).

Method of producing readily soluble dry rosin size in the form of discrete porous particles, and the resulting product. Nos. 394,553 and 394,554. Hercules Powder Company. (Arthur C. Dreshfield and Henry A. Johnstone).

Method of preparing papermaker's rosin size resistant to oxidation by saponification of oxidation resistant rosin, and the resulting product. Nos. 394,555 and 394,556. Hercules Powder Company. (Arthur C. Dreshfield).

Treatment of textile materials with cellulose esters or ethers soluble in water, and then regenerating the cellulose in situ. No. 394,558. Imperial Chemical Industries Limited. (James Craik and Cecil H. Lilly).

Three-stage process for bleaching cellulose materials, comprising treatments with a reducing agent, with a hypochlorite solution, and with an alkaline solution and an oxidizing bleaching agent. No. 394,559. Imperial Chemical Industries Limited. (Ernest Butterworth and Bertram P. Ridge).

Two-stage process for bleaching cellulose materials. comprising treatments with a hypochlorite solution and with a solution containing hydrogen peroxide and sodium carbonate. No. 394,560. Imperial Chemical Industries Limited. (Ernest Butterworth).

Bleaching of bast fibre materials by treating with hypochlorite solution at not over 20°C in absence of actinic rays. No. 394,561. Imperial Chemical Industries Limited. |Ernest Butterworth).

Method and apparatus for adding lead to steel. No. 394,562. Inland Steel Co. (John H. Nead).

Austenitic steel containing carbon from effective amounts to 1.7% lead from 0.3 to 1%, with at least some of the lead being uniformly dispersed. No. 394,563. Inland Steel Co. (Oscar E. Harder).

Method of forming articles of beryllium copper which consists of coating the surface of the beryllium copper with cadmium and then working it to form the desired article. No. 394,564. International Business Machines Corporation. (Leo C. Conradi and Harold F. Barnes).

Process of separating ores using a liquid separating medium and controlled velocity through a separating tank. No. 394,570. Minerals Beneficiation, Inc. (Victor Rakowsky, Ray W. Arms and Grover J. Holt).

Method of altering the aromatic, flavoring and coloring principles of sapid and aromatic materials by hydrogenation in the presence of a catalyst. No. 394,579. Standard Brands, Inc. (William R. Johnston).

Method of improving the aroma, flavor, color and other characteristics of oil-free organic materials by catalytic hydrogenation. No. 394,580. Standard Brands, Inc. (William R. Johnston).

Method of improving the aromatic, flavoring and coloring principles of alcoholic beverages by hydrogenation with a catalyst including palladium. No. 394,581. Standard Brands, Inc. (William R. Johnston).

Processing of organic materials for the production of improved artificial materials, including saponification of filaments, etc., having a base of organic ester of cellulose. No. 394,594. (Henry Dreyfus, Robert W. Moncrieff and Frank B. Hill).

Production of textile material having differential effects by method including saponification of the textile material. No. 394,595. Henry Dreyfus. (Alexander J. Wesson and George H. Ellis).

Method of forming spun yarn containing short lengths of filamentary material comprising organic esters of cellulose, including the step of saponifying under such conditions that the acidyl value is not lowered by more than 2%, whereby the material so treated has a reduced tendency to the formation of static electricity during textile operations. No. 394,597. Camille Dreyfus. (William Whitehead).

Making of mash for whiskey including addition of a small percentage of unpasteurized milk to pasteurized rye meal and malt mash in which lactic acid has already developed. No. 394,600. Arthur B. Foster, Trustee. (Casey J. Wilkens).

Textile material sized with water insoluble cellulosic material so far degraded to be incapable of giving a coherent film by the steps of coagulation in caustic solution, washing and drying, the sizing being fast to laundering; and the method of making it. No. 394,608. Leon Lilienfeld.

Producing compounds of the perylene series by heating a compound of the series having at least one hydroxy or mercapto group with a compound having at least 6 carbon atoms from the class of aliphatic and cycloaliphatic unsaturated hydrocarbons, aliphatic and cycloaliphatic alcohols, esters, amines, mercaptans. ethers and thioethers, in presence of an acid condensing agent. No. 394,609. Henrich Neresheimer and Anton Vilsmeier.

Producing of water-containing dyestuff preparations of high concentration. No. 394,610. Albin Hardt, Albert Funke and Hermann Kocher.

Improving the fastness to light of dyeings with wool dyestuffs on animalized structures by incorporating with the structures non-basic organic compounds having about 10-30 carbon atoms and containing sulfuric acid radicals. No. 394,612. Hanns Rein.

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Method of reducing metallic ores by mixing metallic oxides with activated or absorptive solid carbonaceous fuel, and, if desired, flux, and burning in a reduction furnace to produce metal. No. 394,614. Charles Campbell; Morfit and Ralph H. Sweester.

Method of carrying out the manufacture of acetic anhydride or ketone by the thermal dehydration of acetic acid vapor. No. 394,625. Henry Dreyfus.

Method of diagnosing A avitaminosis in humans by causing temporary impairing of vision by exposure to bright light, measuring the time required to return to normal sight, and using said time as the index of the subject vitamin A supply. No. 394,641. L. Bradley Pett.

Method of coating articles with metallic surface films in vacuo. No. 394,658. Canadian General Electric Company Limited. (Royal F. Strickland).

Synthetic rubber-like composition comprising polyvinyl halide and an ester of acetylated ricinoleic acid. No. 394,660. Canadian General Electric Company Limited. (Maynard C. Agens).

Dehydrated acetone soluble benzyl ether of dextran. No. 394,661. Commonwealth Engineering Corporation. (Grant Lee Stahly and Warner W. Carllson).

Producing ethyl ether of dextran soluble in hydrocarbon solvents used for nitrocellulose by reacting dextran and benzyl chloride in presence of sodium hydroxide at temperature sufficient to effect alkylation of the dextran. No. 394,662. Commonwealth Engineering Corporation. (Grant L. Stahly and Warner W. Carlson).

Production of chromium compounds of mordant dyestuffs having solubility in organic solvents containing hydroxyl groups. No. 394,670. J. R. Geigy S. A. (Achille Gonzetti and Otto Schmid).

New diazo dyestuffs being dark powders soluble in water and giving in acid bath light-fast bluish-violet colors. No. 394,671. J. R. Geigy S. A. (Adolf Krebser).

New azo dyestuffs characterized by the fact that their dyeings are of a pure color shade, and excellent fastness to light, a good fastness to alkaline and acid fulling and a very good fastness to sea water. No. 394,672. J. R. Geigy S. A. (Achille Gonzetti).

Ortho-hydroxydisazo dyestuffs capable of being chromed, being dark powders soluble in water and dyeing wool from an acid bath in blue shades, after-chromed in fast yellowish-green shades. No. 394,673. J. R. Geigy S. A. (Adolf Krebser).

Element capable of permitting fluid flow therethrough comprising a relatively thin highly porous sheet of a homogeneous alloy made from sintered non-compacted metal powder. No. 394,674. General Motors Corporation. (James H. Davis).

Producing high explosive compositions by emulsifying a high explosive organic nitrogen-containing compound together with an inorganic oxidizing salt. No. 394,686. Imperial Chemical Industries Limited. (Alejandro Lifchuz).

Setting a film composition comprising a solution of a binder insoluble in alcohol in petroleum hydrocarbons by exposing the film to the action of water miscible lower aliphatic alcohol in excess over the amount required to dissolve the petroleum hydrocarbon and precipitate the binder. No. 394,687. Interchemical Corporation. (Charles R. Bragdon).

Stabilized styrene containing quinone but not more than 0.25% of quinone as a stabilizing agent, and process of making it. No. 394,693. International Standard Electric Corporation. (Stanley G. Foord).

Stabilized styrene containing not more than 0.5% of one of the group consisting of chloranil, 1-aminoanthraquinone, phenyl-1-naphthylamine, phenyl-2-naphthylamine, methylaniline, metaphenylenediamine paraphenylenediamine paranitrosodimethylaniline and metol. No. 394,694. International Standard Electric Corp. (Stanley G. Foord).

Manufacture of hydrogen peroxide by cyclic oxidation and reduction of an intermediate in a solvent in which hydrogen peroxide is of

Foreign Chemical Patents

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limited solubility. No. 394,696. The Mathieson Alkali Works, Inc. (John C. Michalek and Edward C. Soule).
Treating aluminum-coated ferrous metal by multiple rolling to reduce the thickness by more than 35% and thereafter annealing. No. 394,708. Reynolds Metals Company. (Marshall G. Whitfield).
Azo dyestuff. No. 394,715. Society of Chemical Industry in Basle. (Walter Kern and Richard Tobler).
Mono-aminoazo dyestuffs which are red to dark powders which form in the form of their alkali metal salts dissolve to orange to red, to brown, to violet, to blue and to green solutions. No. 394,716. Society of Chemical Industry in Basle. (Friedrich Felix and Rudolf von Capeller).
Production of butyl alcohol by providing phosphate and ammonia nutrients in the mash, whereby higher yields of neutral solvent are obtained. No. 394,726. Commercial Solvents Corporation. (John Muller).
Production of normal butyl alcohol, isopropyl alcohol, ethyl alcohol and acetone by fermenting a carbohydrate mash containing inverted carbohydrate and degraded protein nitrogen with Clostridium propyl butylicum at 25-36°C and pH 5-6.5. No. 394,727. Commercial Solvents Corporation. (John Muller).
Production of normal butyl alcohol, acetone and ethyl alcohol by fermenting a mash containing inverted carbohydrate and degraded protein nitrogen with Clostridium inverto-acetobutylicum at 25-36°C and pH 5-6.5. No. 394,728. Commercial Solvents Corporation. (David A. Legg and Hugh R. Stiles).
Production of normal butyl alcohol, acetone and ethyl alcohol by fermenting a mash containing soluble carbohydrate and degraded protein nitrogen with Clostridium saccharo-acetobutylicum at 24-40°C and pH 5-6.2. No. 394.729. Commercial Solvents Corporation. (John C. Woodruff, Hugh R. Stiles and David A. Legg).
Production or normal butyl alcohol, acetone and ethyl alcohol by fermenting a mash containing soluble carbohydrate and degraded protein nitrogen with Clostridium saccharo-acetobutylicum characterized by their orange to red chromogenesis at 24-40°C and pH 5.0 to 6.2. No. 394,730. Commercial Solvents Corp. (Cornelius F. Arzberger).
Lacquers and molding compositions containing a synthetic resin obtainable by the reaction of formaldehyde with a condensation product of a phenol with a halogenated aliphatic ketone. No. 394,732. Henry Dreyfus. (William H. Moss).
Printing plates and printing units comprising interpolymerization products of styrene with a nitrile selected from the group comprising acrylic and methacrylic nitrile. No. 394,740. Claus Heuck and Adolf Freytag.
Printing plate and printing units comprising polymerized methacrylic acid methyl ester. No. 394,741. Walter Reppe and Adolf Freytag.
Separation of at least one of the hydrocarbons propane and propylene from gas mixtures containing the same besides other hydrocarbons. No. 394,743. Paul Feiler.
Producing photographic emulsions by dissolving cellulose in an organic solvent, adding alkali to cause partial alkali decomposition, introducing halogen silver having stoichemiometric excess of halogen salt over silver salt. No. 394,744. Friedrich Lierg.
Producing photosensitive material by forming an emulsion of silver halides and colloids dissolved in volatile organic solvent and applying it directly to a carrier containing a colloid of similar character. No. 394,745. Friedrich Lierg.
Method of emptying wood pulp digesters. No. 394,747. Einar Morterud.

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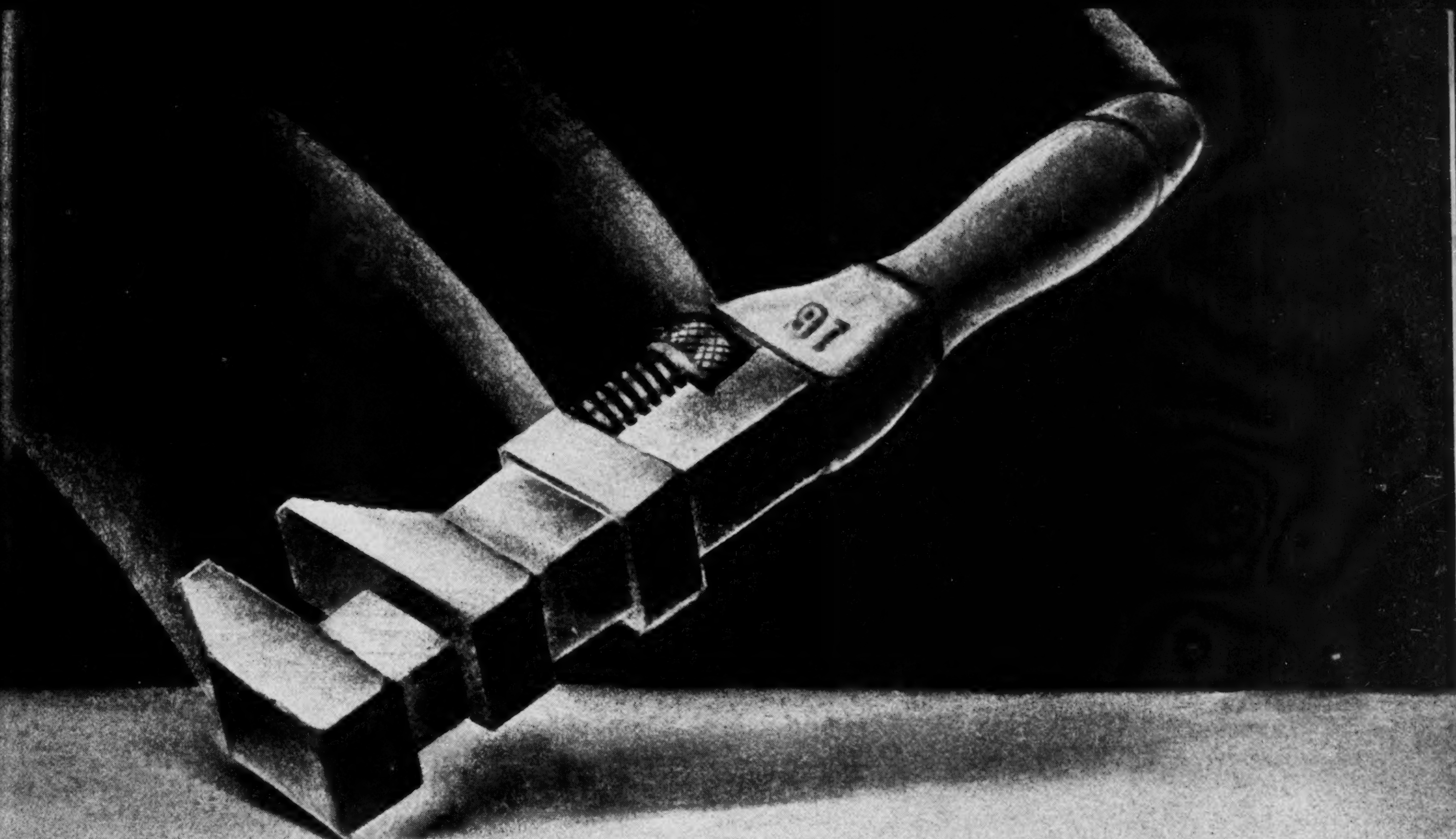
Means for producing a substance which will evolve an antiseptic gas or emanation. No. 394,748. Frederick John Beharrell.
Process for producing fabrics of improved resiliency and which are substantially free from the tendency to slip and ladder. No. 394,751. Camille Dreyfus.
Refractory clinker in which the chemical reactions are completed comprised of interspersed refractory grains of periclase and calcium orthosilicate cemented by monoticellite. No. 394,766. Gilbert E. Seil.
Process for the production of venetian blinds from paperboard. No. 394,773. Clare G. Young.
Abrasive composition comprising finely divided abrasive material intimately mixed and bonded with synthetic linear condensation polyamide. No. 394,791. Canadian Industries Limited. (Willard E. Catlin).
Semi-stiff collar comprising textile fabric layers adhesively bound and containing thermoplastic vinyl resin. No. 394,790. Canadian Industries Limited. (John D. McBurney and Edgar H. Nollau).
Electrolytic apparatus for persulfuric acid and salts. No. 394.792. Canadian Industries Limited. (Robert C. Cooper and Oswald H. Walters).
Separation of coal from indigenous impurities by the intermediation of a water insoluble organic parting liquid. No. 394,793. Canadian Industries Limited. (Willing B. Foulk and Oswald H. Greager).
Color correction process for films. No. 394,794. Canadian Kodak Co. Ltd. (David L. MacAdams and Cyril J. Staud).
Process of conditioning yarn to make it more amenable to textile operations. No. 394,795. Canadian Kodak Co., Ltd. (Joseph B. Dickey and James G. McNally).
Preparing abrasive alumina by fusing finely divided bauxite containing a reducing agent impregnated therein together with a flux. No. 394,802. Chemical Construction Corporation. (Blakeslee Barnes).
Semi-stiff collars including thermoplastic material. Nos. 394,805 and 394,806. E. I. du Pont de Nemours & Co., Inc. (Frank C. Hilberg).
Casein metaphosphate and method of manufacturing it. No. 394,816. Hall Laboratories, Inc. (Charles Schwartz).
Process for the manufacture of thiazoles having a hydrogen atom in the 2 position by reacting hydrogen peroxide with 2-mercapto thiazoles in concentrated acid solution. No. 394,819. Hoffmann-LaRoche Limited. (Hans Spiegelberg).
Preparation of hydrocarbon gases for polymerization from a gaseous source material which is substantially free of entrained liquid and low in sulfur compounds and which contains unsaturated hydrocarbons and some saturated hydrocarbons with 2, 3 and 4 carbon groups along with higher and lower boiling materials. No. 394,821. Houdry Process Corporation. (Eugene J. Houdry).
Catalytic treatment of hydrocarbons to produce gasoline. No. 394,822. Houdry Process Corporation. (Eugene J. Houdry).
Process comprising compelling a gaseous mixture of a hydrocarbon and oxygen to pass through a porous partition at a temperature suitable for effecting partial oxidation of the hydrocarbon and rapidly withdrawing the reaction products as they emerge from said porous partition. No. 394,823. Imperial Chemical Industries Limited. (William A. Bone and Dudley M. Newitt).
Composition comprising petussis toxin free of pertussis bacilli, and process of preparing it. No. 394,830. Lederle Laboratories. Inc. (Edwin F. Voigt and Sara W. Phillips).
Ink drier comprising precipitated hydroxy drying metal salt of naphthenic acid in powder form and substantially insoluble in water and drying oils at a temperature below the decomposition of said salt. No. 394,840. Nuodex Products of Canada Limited. (Arthur Minich).

Additional Canadian Patents granted and published February 25, 1941 will be given next month.

ENGLISH COMPLETE SPECIFICATIONS

Accepted and Published September 25, 1940. ***Continued from page 264, August 1941.***

Apparatus for the extraction of oil from oleaginous material. No. 526.047. E. Lawrence.
Manufacture of combined blending agents and plasticizers for lacquers particularly for coating regenerated cellulose films and sheets. No. 526.169. British Cellophane, Ltd.
Apparatus and process for separating particles having different characteristics. No. 526,056. H. L. McClelland.
Machine for the separation of the yolk from the albumen of eggs. No. 526.245. Keenok Co., Ltd.
Manufacture of unsaturated ketones and ketonic resins. No. 526,117. K. W. Pepper.
Ripening alkali cellulose. No. 526,061. Rheinische Kunstseide A. G.
Production of solid milk products. No. 526,062. Nederlandsche Gruyere-Blokmelk Fabriek, N. V..
Isolating physiologically active materials from animal tissue. No. 526,065. Armour & Co.
Insecticide compositions. No. 526,066. Dow Chemical Co.
Manufacture of vulcanized synthetic rubber-like materials. No. 526,072. Imperial Chemical Industries Limited.
Azo dyestuffs. No. 526,077. Compagnie Nationale de Matieres Colorants et Manufactures de Producits Chimiques du Nord Reunies Etablissements Kuhlmann.
Method of cracking hydrocarbon oil. No. 526.079. Standard Oil Development Co.
Production of a cellulose material from vegetable matter. No. 526,082. Celec Corporation, Ltd.
Water supply installations. No. 526,083. Junkers & Co., Ges.
Synthetic preparation of hydrocarbon to obtain fuels having high anti-knock value. No. 526,084. Compagnie Française de Raffinage.
Casting of aluminum and aluminum-base alloys. No. 526,085. Aluminum Laboratories, Ltd.
Silicon carbide abrasive article. No. 526,130. Carborundum Co.
Oil and solvent-resisting rubber-like material. No. 526,131. Imperial Chemical Industries Limited.
Distillation and fractionation of liquid hydrocarbons. No. 526,131. T. O. Wilton.
Manufacture of wood charcoal and plants or kilns used in such manufacture. No. 516,135. L. H. A. Dunker.
Generator for the production of fire extinguishing foam. No. 526,145. H. F. Hansen-Ellehammer.
Resin compositions. No. 526,175. Cellomold, Ltd.
Formation of co-precipitated calcium sulfate and ferrous hydroxide. No. 526,146. H. S. Colton.
Manufacture of motor fuel. No. 526,149. Texaco Development Co.
Means for removing oil from air or other gaseous fluids. No. 526,151. Aktiebolaget Separator.
Arrangement for raising milk and other liquids by means of pulsating vacuum. No. 526,152. Aktiebolaget Separator.
Plastic cellulose material and method of making the same. No. 526,154. G. H. Vulliet-Durand.
Device for scrubbing combustion gases. No. 526,178. L. S. G. Crespo and A. Galinski.
Treatment of mineral materials with gases. No. 526,180. M. Vogel-Jorgensen.
Method and apparatus for making coated paper. No. 526,188. Champion Paper and Fibre Co.
Method and apparatus for making coated paper. No. 526,189. Champion Paper and Fibre Co.
Flotation reagents. No. 526,190. American Cyanamid Co.
Vinyl resin compositions. No. 526,195. Carbide and Carbon Chemicals Corporation.
Process for the purification of water, particularly for the removal of the silica therein contained. No. 526.254. Auxiliaire des Chemins de Fer et de l'Industrie and G. V. Austerweil.
Production of threads, filaments and the like from viscose. No. 526,206. Courtaulds, Ltd.
Production of artificial threads, filaments and the like from viscose. No. 526,207. Courtaulds. Ltd.
Producing saturated hydrocarbons with branched chains from saturated straight chain hydrocarbons. No. 526.215. N. V. de Bataafsche Petroleum Mij.
Hydraulic fluids. No. 526.216. E. I. du Pont de Nemours & Co., Inc.
Manufacture of stable pharmaceutical preparations. No. 526,258. I. G. Farbenindustrie A. G.
Applying coatings of non-ferrous metals on cast iron. Nos. 526,266 and 526,267. Goldschmidt A. G.
Enteric coatings for medicaments. No, 526.276. Kodak, Ltd.
Making keratin degradation products containing calcium or strontium and gold. No. 526.289. R. von Wulfing, E. Rosskothen, E. Sturm and R Fleischmann
Device for extruding plastic material No. 526,292. Potato Corporation of Idaho.
Synthetic grindstones. No. 526,325. R Boyle.
Phosphating baths, and chiefly baths containing phosphates of iron, phosphate of zinc, or phosphate of manganese. No. 526,326. R. Jacquez-Kahn.
Preparation of water soluble cellulose ethers. No. 526,330. Dow Chemical Co.
Production of dry albumen. No. 526,335. Metallges, A. G.
Apparatus for rendering fats. No. 526.090. Uttley, Ingham & Co. Ltd.
Manganese alloys. No. 526,093. Consolidated Mining & Smelting Co. of Canada, Ltd.



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